

# MOTOR AGE

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No. 10

CHICAGO, SEPTEMBER 2, 1915

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Three dollars a year

## Chalmers Six-40

\$1350

Seven  
Passenger



### 40-Horsepower Valve-in-head Overhead Camshaft Motor

3 1/8" bore x 5" stroke (6 cylinders)

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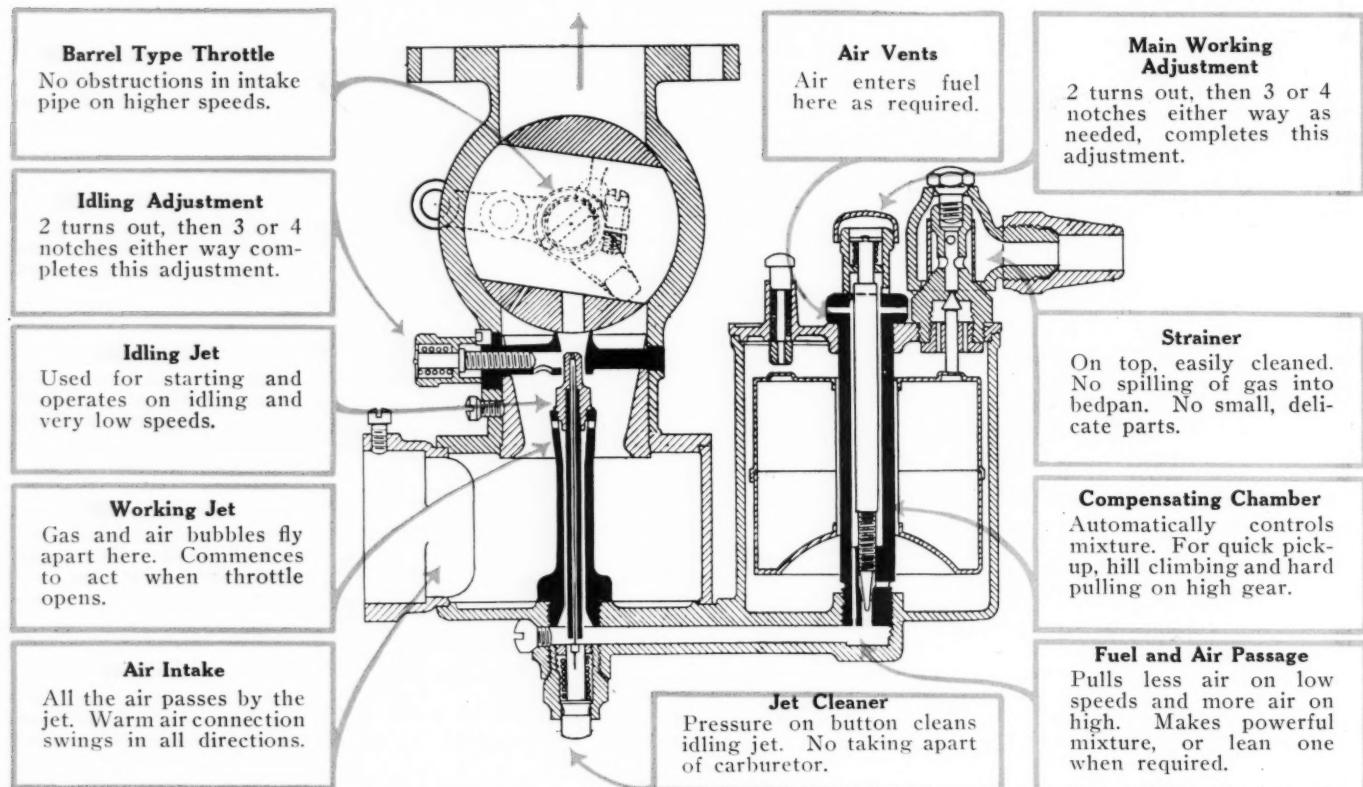
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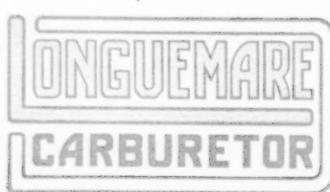
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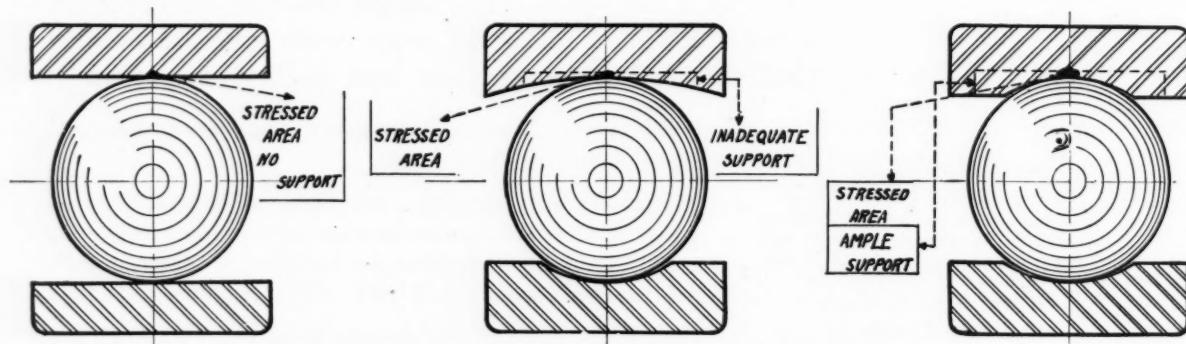
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# MOTOR AGE

## SHAPING the 1916 MODELS



**G**REATLY reduced prices, V-type eight- and twelve-cylinder engines, reduced weight and a distinct development in body design are to be the salient features of the American motor car market for 1916, according to present indications. But the greatest of these is the price reduction—the enhanced car value offered for the car-buyer's dollar as compared with that in previous years.

### Reducing the Price

In other years, increased number of cylinders, more motor power, greater carrying capacity, improved design, or increased equipment carried with it a proportionate increase in price. For the 1916 season we have all of these developments with a decided decrease in first cost.

With one or two notable exceptions every manufacturer, who has carried over a

model for the coming season, has reduced the price considerably and in many instances with minor refinements of body or chassis or else with some increases in the quantity or quality of the equipment supplied.

Possibly the most striking example of this tendency for the new season is the Packard. This car, which until the present has sold as a six at between \$3,000 and \$4,000 now appears as a twelve of most modern design and construction at \$2,600, a reduction of over 30 per cent.

Among other examples Franklin has dropped \$200, Chalmers \$125, Hudson \$200, Hupmobile \$115, Jeffery \$275, Maxwell \$95,

Reduced Prices, V-Type Eights and Twelves, Decreased Weight, Increased Capacity, Better Bodies to Be Features of the Coming Season

Mitchell \$335, Oakland \$200 on the fours, Oldsmobile \$490, Overland four, \$325, and the six \$330, Stearns-Knight four \$235, Studebaker six \$400, and the four \$100, Velie \$195, Paige 46 \$100, Abbott sixes and fours \$100, Allen \$100, Herff-Brooks \$215, Dort \$90, Crow \$425, Davis \$70, and Ford \$50.

Offsetting this somewhat, may be mentioned that Cadillac has increased the price of its eight \$105, listing it now at \$2,080, Stutz roadster has been increased \$100, Abbott eight has increased \$65, Argo \$90, and McFarlan \$90.

In practically every case where a new model has been announced it has been at a price considerably lower than would have been considered possible a year or two ago. This has been in conformity with the reduced prices of the cars that have been carried over.

To find the reason for these lowered

prices you must look into the factory and sales plans of the manufacturer. Legitimate reasons reduce themselves to manufacturing and marketing at a lower cost. Car makers have been able to arrange their plants and purchase raw material so that they can give the buyer the same car as a year previous at a lower price. Sometimes the lower price means that the manufacturer has decided to shave the profits made during the past season.

Such price reductions make for increased sales, which in turn mean that parts and materials can be bought in larger quantities and the factory can be arranged for quantity production; all of which means that manufacturing and sales costs can be reduced and the cost to the consumer cut proportionately.

Approximately half the manufacturers of motor cars have made in part, at least, their plans for the coming season and certain deductions as to what the 1916 car as a whole will be, may be drawn from a study of these announcements.

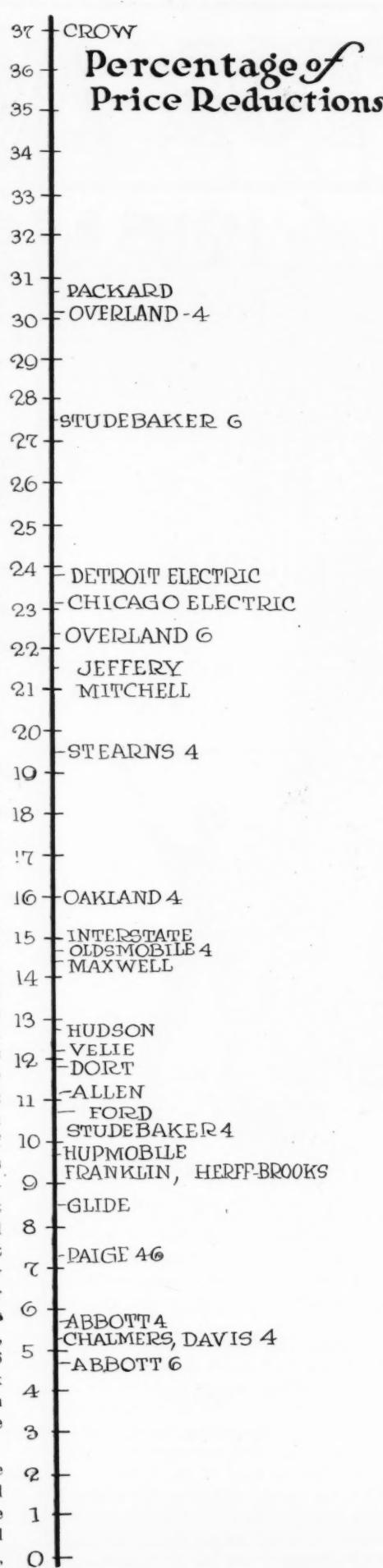
However, too much reliance cannot be placed upon any conclusions arrived at, at a date as early as this for it is almost as hazardous to attempt to predict just what the features of a new motor car selling season will be by scrutinizing the announcement of say half the manufacturers as it is to attempt to foretell the results of an election by a straw vote.

On the other hand, it may be taken for granted that the designs fixed upon by approximately half the manufacturers in the field for 1916 are to a great extent indicative as to what the market as a whole probably will be.

#### Twelve-Cylinder Feature

It goes without question, that the real feature of the new selling season will be a twelve-cylinder engine. That there has been a round half-dozen of these twin sixes announced following the lead of the Packard and National, which divulged their plans last spring, may be taken as evidence that the twin six or the twelve is to be a strong factor in the 1916 market even were not undercurrents of rumor in the trade at hand to prophesy a number of new productions of the duodecimal type as soon as motor manufacturers are in a position to supply the demand. The fact that certain motor builders have not perfected their twelve-cylinder design to the point where they care to offer it indiscriminately probably has a retarding effect upon car makers who are looking to such concerns for a twelve-cylinder engine. All in all, it is safe to say that by the time the 1916 cars make their debut at the New York and Chicago shows, there will be an even dozen of the twin sixes from which the prospective buyer may choose.

The twelves so far announced include Packard, National, Pathfinder, Davis and Enger, while Lozier promises a new twelve with overhead valves which probably will be christened the H. A. L. All of these,



except the Packard, are \$2,000 or under, and the Enger lists at only \$1,095, a figure which was considered only fair for a good four 2 years ago.

Next to the twin sixes what might probably be called the twin fours, that is the eight-cylinder engines, may be taken as being the leader in development in the new market. Cadillac announcement a year ago of a V-type, eight-cylinder engine engendered a movement to that type of engine and eight cylinders were announced with startling rapidity all through the spring and summer. The number will be considerably augmented before the year is out.

#### The Eight Established

At present there are thirteen eight-cylinder cars on the market. Some of these are not yet announced as 1916 models, it is true, but in view of the success that the eight seems to have had as a principle of design, it may be taken for granted that those concerns now marketing 1915 eights will be more than likely to include a motor of similar number of cylinders in the 1916 program.

Among those by whom eights are either being marketed at the moment or are announced as a part of the season's program may be mentioned the Abbott, Apperson, Briscoe, Cadillac, Cole, Hollier, King, Jackson in two different sizes, Mitchell, Oldsmobile, Regal, Stearns, and Standard. In the matter of prices, all but two of these are under \$2,000, the Cadillac listing for \$2,080 and the Standard for \$2,100 respectively. The Briscoe and Hollier jostle each other for the low figure for eight cylinders, the one being \$950 and the other \$985.

In the design of V motors sharp rivalry exists between those makers preferring the L-head cylinder and those using the valve-in-the-head design. Up to the present, the production of V motors has favored the L-head type of castings, but of late the valve-in-the-head followers have been particularly active and more designs with this valve arrangement are being brought out than with the L design. In the V motor the L-head casting permits of a compact grouping of the valve mechanism within the V, but it has been argued that if the V is to contain the motor accessories then the accessibility of the valve springs and parts is impaired. Using the valve-in-the-head design gets away from this objection.

The valve-in-the-head design up to a few months ago was not considered desirable for eight-cylinder, V-design motors, in that it lengthened the cylinder, which made the motor wider, thus crowding the space under the bonnet, particularly in an eight, where the two groups of cylinders are at 90 degrees, although not crowding them so much in the twelve-cylinder design, where the cylinder blocks forming the V are mounted at 60 degrees.

Cadillac and King, who have been deliv-

ering eights during the past year, use the L-cylinder casting. The same is true of Packard and National. Concerns using V motors with valve-in-the-head design are Pathfinder, Enger, Briscoe and Oldsmobile. **The V Knight**

The Stearns eight-cylinder motor is the first of the sleeve-valve, eight-cylinder designs to be announced.

It is quite possible that there will be a number of Knight-type V-cylinder engines.

Among the other new models announced, quite a respectable number are using valves in the head, as opposed to the L or T-head type. These include the Buick, which always has been a staunch supporter of this construction, Interstate, Oakland and Oldsmobile four. The Chalmers overhead valve announced last year as the New Six model is a feature of the present line.

It is to be expected that with the increase of models with V motors, the fours and sixes will show a falling off. Oldsmobile and Jackson have discontinued sixes, replacing them with eight-cylinder designs, Auburn has dropped its large six, but is continuing the smaller one. Kissel has dropped two of its sixes and is concentrating on a smaller number of chassis models. Crow has dropped one of its six models and Davis likewise has discontinued its big six.

On the other hand, the sixes find a staunch supporter in Buick, Haynes and Westcott, which, for the new season, will build nothing but sixes, according to present plans, having dropped their fours. Paige likewise will devote most of its attention to sixes, having brought out the new Six-36, which probably will fill the same field, and at the same price as its older Four-36, and is a complement to the Six-46, announced a year ago.

Two other companies have entered the six field for the first time, Empire and Great Western, and the Jones and the DeKalb are products of new makers. Patterson, Cameron, Westcott and Overland also have small sixes which are new this year. All of these except the DeKalb are small, moderately-priced cars, none of them is listed at as high as \$1,300, and all of them are built on light chassis. The DeKalb, on the other hand, is a high-powered car at \$2,250.

In considering the engine designs for 1916, we find that poppet valves still hold their own. The rotary-valve designs which have made their appearance from time to time so far have not shown in the 1916 calendar. The Great Western, which offered a rotary-valve chassis heretofore, seems to have abandoned it, temporarily, at least. The new Willys-Knight has the distinction of being the first Knight-motored car to sell around \$1,000.

The fact that the Willys' interests have taken up the Knight, that the Moline has been produced at a very much lower price than formerly, and that the Stearns has developed an eight Knight at a moderate figure, adds considerably to the sleeve-valve program for 1916, particularly as the Willys-Knight marks the first high production marketing of the sleeve-valve in America.

#### High-Speed Engines

Coming to the internals of the 1916 motor, it may be taken as generally true that there has been a great advance in lightening reciprocating parts. Connecting rods and pistons have been reduced in weight by the use of new alloys and new sections. Aluminum alloys have made it possible to reduce the weight of pistons very considerably and reduce the weight of the engine as a whole. Engines with aluminum cylinders will not be found lacking among the 1916 cars, experimental mo-

tors with aluminum cylinders having been in successful use for several months.

Block casting, resulting in a very compact design, is more than ever on the increase and with it the use of fewer bearings and short shafts, which have given an opportunity for larger diameters. Flywheel bearings are longer, chiefly on account of the widespread use of motor starters which engage with the flywheel. Built-up piston rings are more in evidence in the attempt to assist in providing the sought-for increase in flexibility. Detachable cylinder heads, while not at all universal, seem to be a point toward which the designers travel.

One of the things noticeable in the new designs is the speeding up of the engine, made possible by shorter crankshafts and lighter reciprocating parts, together with better carburetion, ignition and scavenging. Any development which tends to decrease the vibration and assist in getting the gases in and out of the cylinders rapidly makes for high speed.

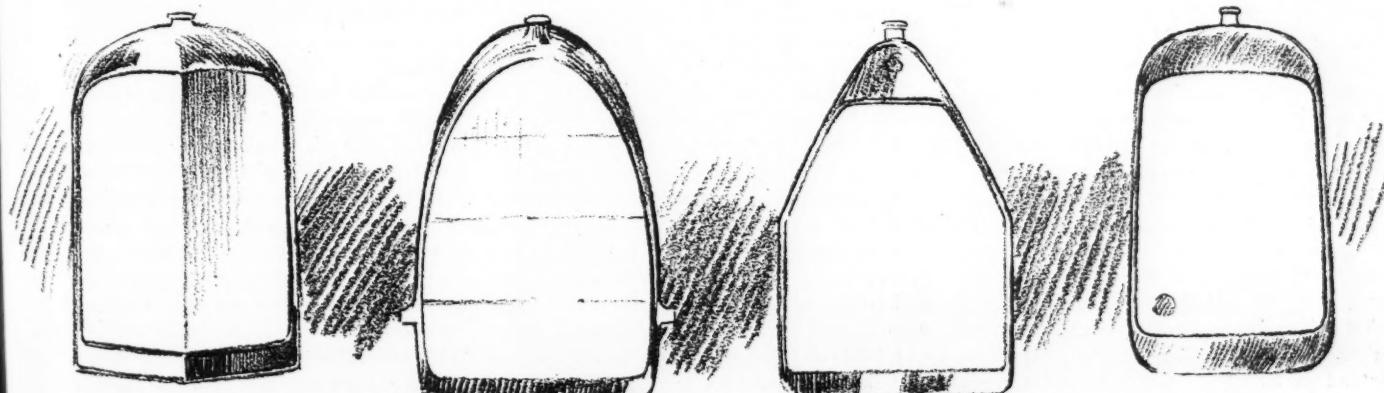
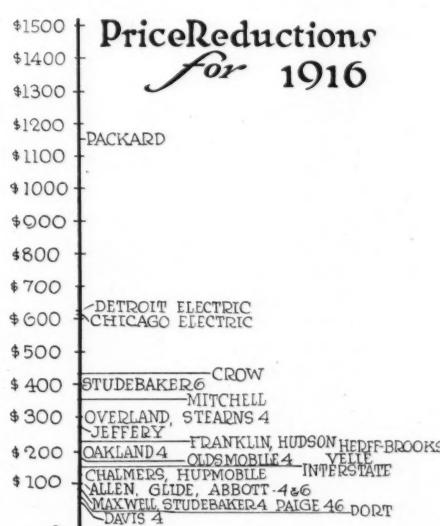
Higher engine speeds have made it advisable to watch cylinder temperatures a little more closely and eleven manufacturers have announced Motometers as part of the 1916 stock equipment.

Unit powerplants are increasing. The tendency is in assembling products to buy in one assembly the entire gearbox, clutch and motor. Even concerns which are making their own powerplants have unified it in some instances. Packard is the most prominent example, the new twin six having the gearset up forward, instead of on the rear axle, as used by Packard for years. McFarlan also has dropped the rear axle location.

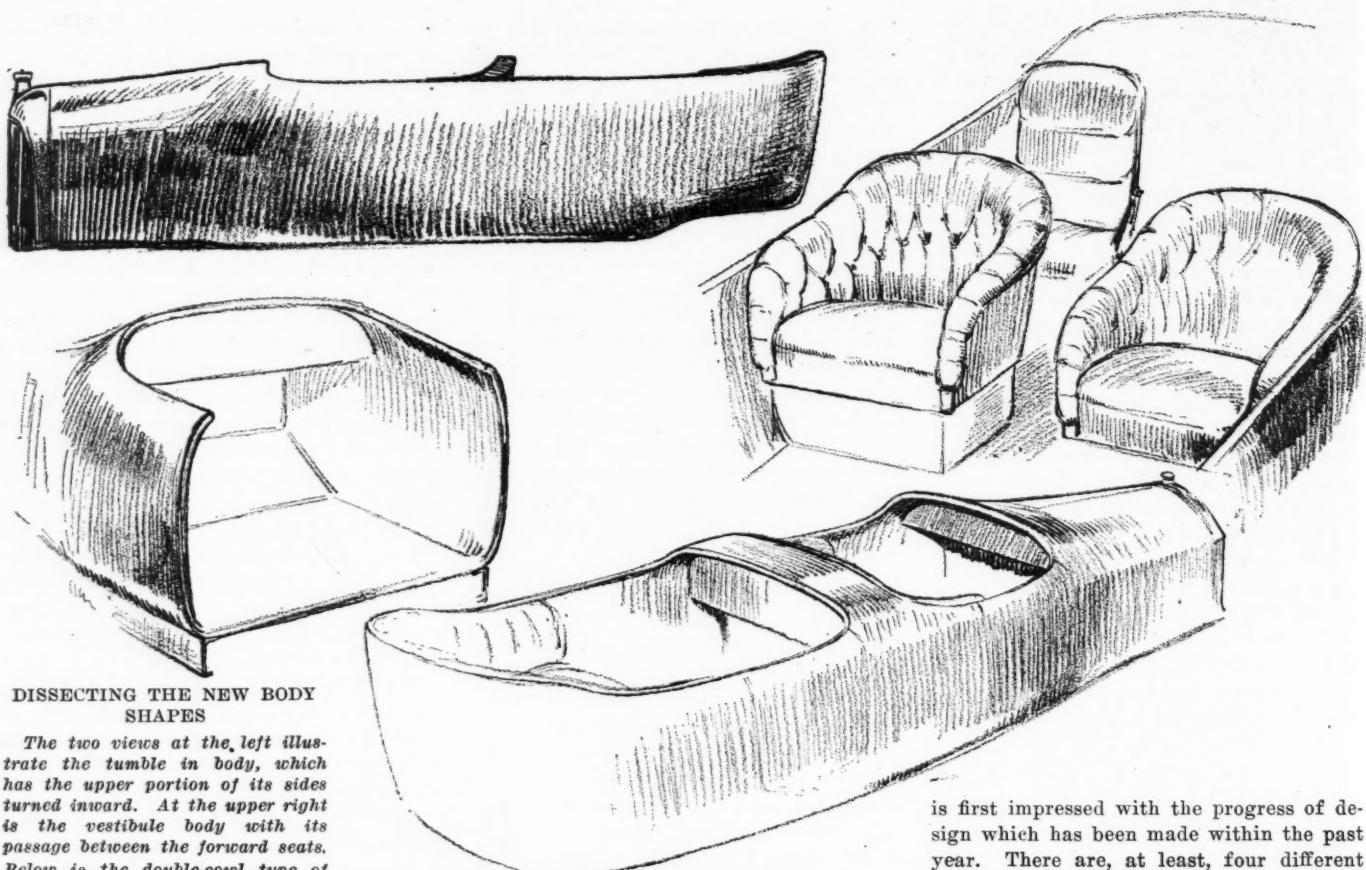
#### Moves Gearset to Rear

On the contrary, the new Paige 36 has its gearset at the rear instead of in unit with the motor, as has been previous practice. In the transmission system, the use of hollow propeller shafts is on the increase. The National twelve and Pathfinder twelve, the Great Western, the Lewis, Mitchell, Glide and Westcott all have replaced the solid shaft with a stronger and lighter hollow type.

This lightening has been extended throughout the entire car. Lighter motors are much in evidence and the weight re-



RADIATOR SHAPES OF 1916 CARS. FROM LEFT TO RIGHT: PAIGE, FIAT, LEWIS AND SAXON SIX



DISSECTING THE NEW BODY SHAPES

The two views at the left illustrate the tumble in body, which has the upper portion of its sides turned inward. At the upper right is the vestibule body with its passage between the forward seats. Below is the double-cowl type of body

duction has gone on at other points as well. As examples, Franklin has reduced the already low weight of its car another 75 pounds by using aluminum waterjackets and fenders.

Jeffery has made a reduction in weight of its electric system. The Mitchell six has had 400 pounds cut by new design of the frame, the use of tubular shafts and so on, and the National has reduced 600 pounds by the use of stronger materials and newer chassis design.

#### Cantilever Springs in Favor

Cantilever springs are to be a feature of the 1916 cars and among those announced with this suspension are Auburn, McFarlan, Mitchell, Moon, Oldsmobile, Enger twelve, Pathfinder twelve, Velie and Westcott. Along with this naturally enough is a proportionate increase in the Hotchkiss drive. Driving through the spring and the gradual elimination of torque and radius rods are to be noticed, although this practice was once looked upon as dangerous. The points in its favor are that it makes more flexible starting and stopping and relieves the transmission units from too sudden shocks.

Spiral-bevel rear axle drives show a decided increase and the gear ratios are somewhat higher than in previous years, thus permitting higher engine speed, necessary with the smaller high-speed engines.

Tire sizes have increased slightly, Studebaker, for instance, carrying 34 by 4 tires, instead of 33 by 4. Other manufacturers are making similar increases, occasioned

both by increased carrying capacity of the cars and also by an endeavor to work for longer tire life.

This increased carrying capacity has been brought about through a lengthening of the wheelbase. In many instances there has been a distinct increase in body length, which necessitated a somewhat longer wheelbase than specified in the 1915 plans. Briscoe, for example, has added 7 inches to the length of its car, Studebaker has added 4 inches on the four-cylinder and 1 inch on the six, and the Allen is 2 inches longer than formerly.

Vacuum-gravity fuel feed is used on 35 to 40 per cent of the 1916 cars, whereas at the first of this year only 20 per cent used it. There has been a remarkable drop, in fact, very general abandonment of pressure feed gasoline systems, which were in ascendancy among the medium and better class of cars until the vacuum-gravity system was introduced in 1914.

The use of single ignition in connection with the battery starting and lighting outfit is increasing. The necessity for a permanent supply of electricity for cranking and lighting has rendered it unnecessary in the minds of many to have a separate source of current for ignition when it is only necessary to transform and distribute properly the current which is constantly at hand in the battery. Further, the magneto people were not prepared with eight and twelve-cylinder instruments.

It is in the exterior appearance and fittings of the new cars, however, that one

is first impressed with the progress of design which has been made within the past year. There are, at least, four different directions in which the designers have worked. The most nearly universal of these is that extension of the boat body concept, with its tumble-in sides. In this design the sides give the appearance of being closer together at the top than lower down, that is, a cross section would resemble a flat ellipse or oval, with its bottom flattened and a part of the upper arc cut off. The sides for 1916 are rather higher than in the 1915, the tendency being for a more nearly straight line from radiator to rear seat back, thus eliminating the conspicuous cowl.

#### Body Improvements

Another body tendency is the increased use of the double cowl, the design wherein in the back of the front seat is much thicker fore and aft and has a paneling over its top, providing space for lockers, and, in some instances, for spare seats as well. Among the cars in which this double cowl effect is in evidence are the White and Mercer, of which this is the 1915 feature, and the Cole, Stutz, Enger and McFarlan.

Vestibule bodies, of which National and Kissel were the chief exponents at the first of the year, have been adopted by a number of other makers. This idea consists in the complete separation of the two forward seats, making them individual chairs. In some cars these chairs are adjustable with one reversible, so that the passenger may face the rear seats. This was brought out originally in conjunction with the Kissel two-door body, wherein a passage between the two forward seats made the elimination of the front doors

possible. Among the cars using the vestibule body are National, Kissel, Haynes, Stutz, Great Western, Westcott, Abbott and Fiat.

#### Cloverleaf Roadsters

The three-passenger roadster body, which from its seating arrangement is called the Cloverleaf, has found favor with a number of manufacturers. This consists in the separation of the normal roadster seat, so that a third seat is incorporated between, and to the rear of the two forward ones, with a vestibule between the forward seats. It has the advantage of providing room for an extra passenger without the make-shift of a rumble seat and, at the same time, with only two aboard, they are seated sufficiently close together for sociability. Marmon, Haynes, Briscoe, Apperson and Owen are among those who have adopted this seating arrangement.

Convertible bodies probably will be more in evidence during the coming season than previously. Former objections to the

all-weather body were that the inclosed top either was difficult to install or else gave the appearance of being an afterthought, seem to have been pretty well overcome. Some of these take the form of sedans into which touring cars may be converted and some coupés which are converted roadsters. Other makers have contented themselves with a cabriolet roadster with its inclosed folding top. It is too early in the season to give any complete idea of what forms these will take, but among those who have already announced convertible bodies are Chalmers, Cole, Hudson, Hupmobile, King, Kissel, Maxwell and Premier.

Of the more conventional form of inclosed bodies little is to be said at present, as the season is not sufficiently advanced to give a fair review; however, it is safe to assume that the same tendencies that are in evidence in the open bodies will be found in the closed types when they are all made known at the New York show or earlier.

### Rounding Off Sharp Corners Avoids Accidents

AT most street intersections the radius  $A$  of the curb at the street corner is such that a motorist desiring to turn the corner finds it impossible to describe an arc of turn that will enable him to maintain a moderate rate of speed and still keep his machine on the proper side of the pavement while turning into the cross street. The radius of the curb curve is usually but

little over 1 foot, hence the driver cannot commence to turn until he has practically passed the corner. Increasing the radius of the corner curve up to say, 12 or 14 feet, will permit most types of cars to turn a corner at the same distance from the curb as when driving down the street.

Changes such as suggested by the ac-

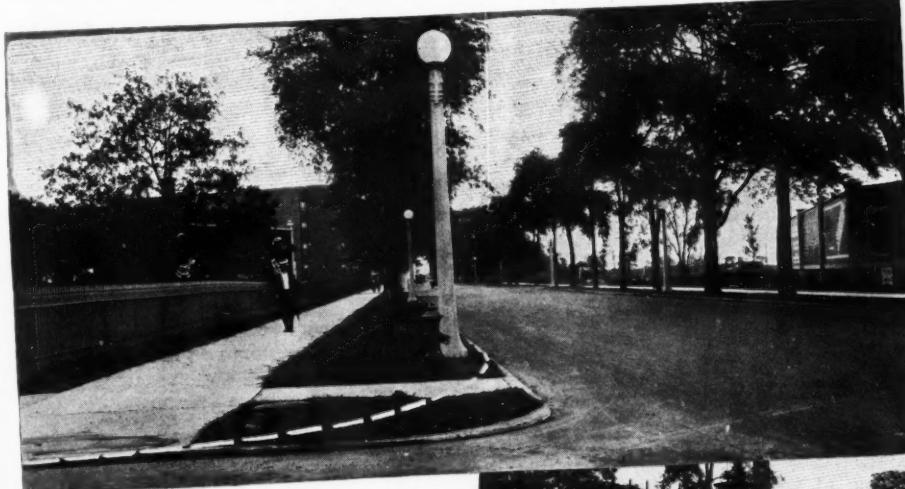
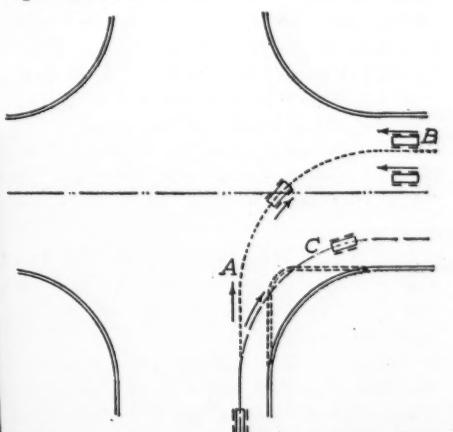
companying sketch have been made at several street intersections in Chicago, notably at Lincoln parkway and Diversey boulevard, and at Devon and Evanston avenues.

How materially the possibilities of making the desired turn within the proper cones are facilitated will be seen by referring to the sketch. The double dotted lines show the curb at the usual street corner, while the double solid lines back of these illustrate what has been accomplished at the two localities mentioned—the change at Lincoln parkway and Diversey boulevard being shown in an accompanying photograph.

#### How Change Aids Driver

Without such construction, a driver following the line  $A$  in the direction noted by the arrow, and turning into the intersecting street, would have to cross its center line and could not pass two cars coming toward him as indicated by the arrows  $B$ . Increasing the radius of the curve, as shown by the solid lines permits the driver to follow the arc of the curb and thus keep to the right of the center line of the street where he properly belongs. This is clearly illustrated by the line  $C$ .

Such an improvement is particularly desirable on boulevards or where other streets intersect with boulevards. It is likewise desirable at intersections of narrow streets. This subject deserves the attention of engineers in charge of street improvements.



VIEWS AND DIAGRAM OF A CHICAGO STREET INTERSECTION

The upper left view shows the corner of Lincoln parkway and Diversey boulevard before change in turn was made, the dotted line indicating the after effect. The lower illustration shows the reverse. The diagram in the upper right-hand corner shows the ease with which the corner may be turned since it has been reconstructed and also the former difficulty



# Shunned Jitney Is Boon from Heaven

## Galveston Welcomes Cheap Motor Transportation When Streets Are Flooded and Traffic Tied up

**G**ALVESTON, Tex., Aug. 30—Jitney passenger cars never were a success in Galveston until—

The hurricane of August 16 put every street railway line out of commission,

Wet every piece of electrical apparatus essential to the operation of trolley service,

Covered the street railway tracks with from 1 to 10 feet of sand from the Gulf of Mexico or

Undermined the tracks to a depth of from 1 to 10 feet, leaving holes on which the labor of gangs of men was spent for many days,

Shattered the water mains which crossed Galveston bay and which supplied water for the operation of all power plants,

Left 40,000 people bereft of their accustomed method of locomotion.

Robbed many men of every thing they had except motor cars, and took away many of these, making it necessary for

Several dozen motor car owners to make their living with their cars or not at all, and

Leaving the streets in such condition that nothing but a genuine, really-truly jitney could negotiate their hills and dales.

Consequently jitneys now are a success in Galveston and hundreds of hardy motor vehicles weave their tortuous way through the disheveled streets of the stricken city.

Carrying thousands of footsore and weary strap-hangers who welcome the much despised innovation as a boon from heaven.

Earning dollars by the score for their impoverished possessors who, by the way, are charging a dime for their service, and their service, and

Causing street railway owners to wonder where they will find buried under the wastes of the storm the old time popularity that was theirs.

For, born of necessity, the jitney craze in Galveston may become an institution of convenience. If you think it is not a necessity, explain why Mr. Blank hooks two delivery wagons to the tail of his Flivver and fills the whole fleet with passengers at 10 cents per.

### N. A. C. C. TRAFFIC MANAGERS MEET

New York, Aug. 30—Notice has been issued by the National Automobile Chamber of Commerce of a meeting of factory traffic managers and members' representatives to be held in Detroit, September 14, at the Detroit Board of Commerce. Among matters to come before the meeting for consideration are extra demurrage or storage charges on motor cars held in freight cars at destination, whether batteries can

reasonably be considered a component part of engine starters and subject to the same rates, damage to motor cars by sparks and cinders entering cracks around doors of freight cars, effect on motor car shipments of the ruling by express companies that carload rates do not include wagon service and that such shipments are subject to extra switching charges, advertising matter on freight cars and recommendations to be made to the Uniform Classification committee regarding the classification of various items.

### MOTOR TRUCK RUNS PRESS

Galveston, Tex., Aug. 31—A motor truck of the Wichita make provided the power for operating the press of the Galveston Tribune during the period that the power plant was out of commission as a result of the recent tropical hurricane. When it was seen that it would be impossible to restore the power plant to duty for probably several days, ways and means for operating the press temporarily were considered.

The suggestion was made and quickly adopted that a trial of a motor truck be made. The truck was backed up to the sidewalk in proper line with the press machinery. The belt was attached to the wheels of the truck, the latter being jacked off of the ground. The improvised power plant worked perfectly and copies of the newspaper were soon upon the street.

Many motor cars in Galveston and other towns and communities in the storm-stricken coast district were badly damaged by the storm. Several were swept into the gulf and probably will be seen no more. But for the motor service that was inaugurated here during the time that the hurricane was raging, the loss of life would have been much greater.

### HURRICANE AIDS BEACH SPEEDWAY

Port Aransas, Tex., Sept. 1—One of the most remarkable changes which the recent tropical hurricane made in the outline of the Texas coast was the complete obliteration of Corpus pass, which from time immemorial served as the deep water channel separating Padre and Mustang islands. The discovery that this pass no longer existed was made by fishermen who found the way closed to their boats when they attempted to pass from the bay into the gulf after the storm had subsided. The channel is filled high and dry with sand and the two former islands are now as one.

In one respect, the change which the elements wrought is welcomed by the people of this part of the gulf coast region in that it adds about 80 miles to the pro-

posed motor beach speedway. Padre island had an original length of about 90 miles.

It is claimed by motor enthusiasts that the beach on both the gulf and the Laguna sides of Padre island is the longest and best natural motor car speedway in this country. The entire course is hard, sand-packed and almost level. The same condition applied to Mustang island which is now joined to the longer course. The round-way speedway now is about 260 miles long.

### MOTOR EXPLODES; SKIES RAIN IRON

Winchester, Ky., Aug. 28—Motor car experts of Winchester are puzzled over an explosion of an engine in a motor car owned by C. C. Billiter, which blew up near the L. & N. railroad crossing on North Main street Thursday night. Several persons narrowly escaped injury and the front end of the car is a complete wreck, the machinery having been blown to atoms.

Several pieces of iron were hurled as far as the Union station, more than a block from the scene of the accident, and iron is said to have fallen like rain on the roofs of a number of nearby stores.

### ORDINANCE GOVERNS FILLING TANKS

East St. Louis, Ill., Aug. 30—The city council last week passed an ordinance prohibiting the filling of motor car gas tanks while the machine's headlights are burning. The new law further stipulates that the engine must be stopped during the process of filling the gasoline tank. Penalties of from \$5 to \$200 fines are provided for violation of the law.

### WILL NOT DEFEND DRINKERS

Boston, Mass., Aug. 30—So many instances have come up in the Massachusetts courts in which motorists have been arrested charged with driving cars while under the influence of liquor that the Automobile Legal Association of Boston, Mass., has come out squarely with a statement that it will not defend any member arrested upon that charge. The association states that since it was organized 8 years ago no member has ever been defended on such a charge, and while it does not expect to be called upon to do so, its directors decided to place the association on record so that no member who is arrested on that charge can seek the aid of the association's counsel whether or not he is guilty. The association has some 8,000 members.

### FAILS TO MEET GAS PRICE RAISE

St. Louis, Mo., Aug. 28—The latest skirmish in the so-called gasoline price war between the Standard Oil Co. and the independent dealers in the St. Louis district has developed into a test of endurance between the belligerents.

Ten days ago the independents raised the price of all grades of gasoline 1.1 cents a gallon and announced that this was the first of a series of increases by

which they hoped to bring the price of gasoline back to the figure which the Standard Oil Co. had cut in half during the 18 months' war.

The independents predicted that the Standard would follow their lead in increasing the price of oil just as the independents had followed the lead of the Standard eight times in cutting the price 1 cent.

The independents point to the steady rise of crude oil and to the fact that the price of gasoline to the St. Louis consumer has been lower than at almost any other place in the country as justification for their raise. The readjustment of railroad rates on petroleum and its products in car-load lots from the midcontinent fields, which was ordered by the interstate commerce commission this week, independents say, will necessitate another increase in the retail price.

#### ADVANCES GASOLINE PRICE IN N. J.

Bayonne, N. J., Aug. 27—The price of gasoline in this city, where much of the supply is made by the Standard Oil Co., was raised 1 cent a gallon to the dealers yesterday and they in turn increased the price to customers. The price is now 14 cents a gallon, an increase of 3 cents within a month. In Alabama the price has been advanced 1 cent a gallon and in North Carolina 1 cent a gallon to 16 cents. At most Georgia points the price has been raised a cent a gallon to 16 cents, but in Atlanta the quotation has been advanced 1½ cents to 14 cents. In Virginia, an increase of 1 cent to 13 cents a gallon is announced.

#### REPORT ON GASOLINE SALES

Milwaukee, Wis., Aug. 30—Vast inroads have been made by independent petroleum marketers upon the business of the Standard Oil Co., according to statements made in addresses before the eighth annual convention of the Independent Petroleum Marketers' Association of the United States in Milwaukee from August 24 to 27. Authoritative statements were made that since the organization was formed 7 years ago, the independents have increased their proportion of total sales from a bare 20 to a good 45 per cent, reducing the proportion of the Standard from 80 to 60 or 55 per cent. In Wisconsin, where the Standard operates about 130 stations, it markets about 50 per cent of the entire quantity of light gas sold, while its sales in the large manufacturing centers are only 25 per cent.

Closer coöperation between marketers and refiners was the plea of several prominent speakers. The constant business antagonism between the refiner and jobber was called the greatest drawback to better prices and more sales.

The filling station was called the ultimate solution of the marketing of gasoline for the independent dealer.

## Posse on Trail of Motor Tax Dodgers

### Vigilantes, Who Pursued Horse Thieves in Days of Old, Rounding up Forgetful Owners in Kansas

TOPEKA, Kan., Aug. 30—A squad of six scouts, mounted on fleet motor cars, will penetrate the fastnesses of Kansas country roads this month, to discover and apprehend the miscreant owners who have failed to take out licenses. At the head of the vigilantes will be John Wall, of Parsons, for many years president of the National Anti-Horse Thief Association. The scouts have received their instruction from the secretary of state, and will be dispatched to various parts of the commonwealth.

These are tried and true men, who have been assigned to such dangerous duties connected with the upholding of the dignity and replenishing the treasury of the great state of Kansas. Many a time has each of these redoubtable deputies, sitting nonchalantly in the saddle, pressed the spurs into the side of his trusty steed, and galloped across the prairie to the accompaniment of a fusillade from his six-shooter, in pursuit of the wily tax-dodger.

The faithful broncho is a steed of other days. The motor car has replaced him as the mount of the modern vigilantes who ride, not in pursuit of the horse thief or cattle rustler but to bring to justice the motor car owners who have judiciously overlooked the payment of license fees.

#### STOP STEALING OF TIRES

Kansas City, Mo., Aug. 30—The sending of four motor cars and accessory thieves to the penitentiary from Kansas City, the arrest of several persons charged with such thefts, the killing of a negro while he was escaping in a stolen car, and especially the large publicity given to charges that junk dealers had been buying stolen tires and accessories, have combined to improve the situation in Kansas City.

It was announced recently that motor tire thefts had fallen off about 70 per cent in 2 weeks. The police had been issuing veiled threats against junk dealers, and complaining of the lack of evidence.

Another source of improvement was the publicity given the alleged fact that thieves of tires had sold many of them to motor car owners. It was said that thieves picked out owners whose tires showed wear, made deals for the sale of tires at \$5 and \$10 apiece, and then proceeded to steal the tires ordered.

#### CAR THIEVES BUSY IN AUGUST

Chicago, Sept. 1—Motor car thieves were active in Chicago during August, records at the detective bureau showing that 246 machines were taken and about 95 per cent of them recovered. As usual, the crooks were partial to Fords, a large majority of the cars stolen being of that

make. A large percentage of the thefts were reported from the residence districts. Tires and other accessories stripped from cars during the past month amount to several thousand dollars.

#### LOW TAXI RATE IN CHICAGO

Chicago, Aug. 30—Taxi rates were slashed today when the Yellow Taxicab Co. announced that hereafter the average trip in the loop district would cost but 20 cents and that a passenger might ride from one end of the business district to the other for 30 cents. This is the lowest rate in the United States and is equaled only in Paris, where one may ride in a taxi for 1 franc, or 20 cents.

#### TAKES NIGHT MOVIES WITH MOTOR

Phoenix, Ariz., Aug. 30—Romaine Fielding, director of the Arizona Lubin company, with headquarters at Phoenix, Ariz., has equipped a fleet of motor cars with apparatus for making motion pictures at night. Motion photography with artificial light, which heretofore has been unknown, also is now possible with Fielding's equipment.

On a touring car chassis, there is a 35-horsepower portable plant. This independent traveling power plant supplies light through running wires in crevices and dark places. Fielding also may use the power for exhibiting pictures where there is no wiring.

In addition to this work, the plant provides power for a powerful 12-inch navy searchlight, mounted on the seat beside the driver. This may be operated either while the car is in motion or standing still. The capacity of the searchlight is 4,500,000 candle power and when in operation, requires twenty-five per cent of the full power of the plant.

There is another car in the fleet equipped for carrying the cameras and supplies and two touring cars for the players. The first big production in which the equipment will be used to advantage is a twelve-reel feature drama, which is to be taken in various parts of Arizona, including the Grand Canyon.

#### BROWN-LIPE-CHAPIN EXPANDS

Syracuse, N. Y., Sept. 1—The Brown-Light-Chapin Co., of this city, has decided to equip the Light Model Works, also located here, with special machinery for manufacturing M. & S. differential gears exclusively. The special M. & S. differential for Ford cars will also be made in this plant but replacement sales for the Ford type will be handled from the M. & S. Gear Co., Detroit, Mich.



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## Preliminary Survey of 1916

NOW that over half of the manufacturers of representative American motor cars have made known in part, at least, their plans for the selling season of 1916, an opportunity is offered to digest these announcements as has been done on other pages of this issue and present a fairly comprehensive and accurate view of what the market as a whole may be expected to be for next year. It is not always safe to attempt to point out the direction in which an industry is tending without nearly complete returns, but when there is such an avalanche of straws as exists at present, it is possible to determine closely the direction of the wind. Certain tendencies have shown themselves so nearly universal as to make general deductions reasonable.

MORE car for the money seems to be the essence of the 1916 announcements. This does not mean merely that bigger cars in point of dimensions are offered, although this is a fact, but it does mean that the buyer of a 1916 model will get much greater car value for his dollar than he ever has been offered before. Motor cars of 1916 are better in point of power, lightness, accessibility, wearing qualities and carrying capacity. They are more handsome examples of the body designer's art. The little comforts that make all the difference between motoring pleasure and motoring hardship are present in greater force for the new season.

THE 1916 models are easier to buy. Not only do they offer more for the money, but sweeping price reductions have been made. Cars are selling for the 1916 season at prices heretofore believed impossible. With more cylinders, roomier and more beautiful bodies and better design throughout, all precedents have been upset by concomitant reductions in first cost of the 1916 car.

## Broadening the Electric Field

THE electric passenger car is receiving several boosts of late which should bring it closer to the great popular field, but even yet it is not in that broad field of the popular buyers which the gasoline field invaded some years ago. Besides very heavy reductions in price which started late last year and which are continued in the announcements of 1916 models, there is another movement that it is hoped will broaden the electric field, namely, that of either renting batteries or establishing means whereby batteries can be exchanged, thus freeing the owner from the necessity of waiting a great many hours while the battery is being recharged.

THE industry needs more of this better business injected into it. Manufacturers and garagemen can do much to broaden the electric field in these days when the gasoline car with its coupé or sedan bodies and its electric starting and lighting has been invading rather heavily the electric field in many localities. The more concentration on the electric business the better. It is to be hoped that these new battery policies of either renting or

MAXIMUM of complexity and costliness in motor cars was reached 2 years ago when electric lighting and cranking were recent additions. Instead of being component parts of the design of the car, these functions were afterthoughts, installed in deference to demand on cars for which no adequate provisions had been made. The past years have seen these features simplified and incorporated as an integral part of the design of the car as a whole.

MECHANICALLY, the feature of the season is the eight and twelve-cylinder engine. The reason for existence of the motor with a greater number of cylinders than six, is the desire for smoothness and flexibility to a degree possessed heretofore only by steamers and electrics. That the eights and even the twelves can be obtained for the new season at a cost under that of many of the sixes less than a year ago perhaps is one of the best evidences of the more-car-for-the-money idea which seems to be permeating the industry this season. It reflects the advances that have been made by manufacturers in production and sales methods.

CARS in their old days were anything but objects of beauty, at least, as judged by present standards. That the frills and furbelows of a number of years ago have been superseded by the simple, sweeping lines of today is an evidence of a closer harmony between chassis designer and body builder. It is an adage among engineers that the shape and proportions best suited to do a given work ultimately will be found the best from an esthetic point of view. Clean smooth lines of the new cars are pleasing because they convey the impression of being eminently fitted to their work.

## Exchanging will not divide the ranks of electric makers.

Unity and not division is needed. Before divisions take place there should be every effort made for all factions to get together, and pull together for the electric passenger car business for the good of all.

THE electric passenger car occupies a unique field, but a field which has narrowed because of the heavy reductions in the price of gasoline machines as compared with electrics during the last 5 years. Now that the electric makers are coming into the price zone where the gasoline car has brought competition, it is hoped that the electric makers will use every fair means to present a united front to the competitor, and that whether battery rental, or battery exchange policies are in vogue in different cities, that the great aim will be co-operation of all those interests that should unite in order to push the electric vehicle as it should be pushed. Broadening of the field and more intensive sales effort are needed.

# General Wood Would Muster Motors for Military Service

## Proposes a Plan of Organizing Vehicle Car Owners for Defense—Urges Standardization of Truck Parts and Tires and Strengthening Highway Bridges

PLATTSBURG, N. Y., Aug. 30—General Leonard Wood, U. S. A., in an interview here, expounded a plan for the organization of motor vehicle owners for military defense. The plan of the commander-in-chief of the U. S. army, based on long experience with older forms of transportation and in the various experiments which the government has made with motor equipment, contemplates the organization of military instruction camps in all parts of the country, to which the millions of motorists would go with their vehicles and receive instruction from regular army officers. General Wood advocated that the different motorists be grouped according to make of car, rather than geographically, as uniformity of mechanical details is of great importance in the strenuous service of the battlefield.

Each car sent to such a training camp would be accompanied by its owner or his representative and several additional men, according to the passenger capacity of the machine, so that for every few hundred vehicles there would be a regiment of men. Transport trucks, armored scouting cars, ambulances and machine guns would be assigned to each motor regiment.

General Wood made a special plea for standardization of motor truck parts, and especially of tire sizes. He also urged that road commissioners see that all bridges on main roads be of sufficient strength to sustain the weight of heavily-laden vehicles, pointing out that, through no fault of the vehicles, the motor gun troop which ran the 400 miles from New York to Plattsburg required 4 days for the trip because of the frequent detours necessary to avoid weak bridges. Many of these had to be bolstered up and some completely rebuilt before the heavy apparatus could make the passage safely.

It has been found that the field guns, which were towed by the motor trucks, suffered from the vibration induced by their steel tires, while the men who rode on them found it exceedingly fatiguing, as well as difficult to cling to their seats. Rubber tires will have to be fitted to both guns and caissons for motor service.

### EDISON WANTS MILITARY ROADS

East Orange, N. J., Aug. 30—Thomas A. Edison has come out strongly for improved roads and bridges as a means of insuring quick movements of troops in case of war, even at federal expense. Mr. Edison is quoted as follows:

"I should go beyond the mere providing of men and munitions, and I would have the government revamp the country on a strategic basis; for instance the government ought to build a system of mili-

tary roads along the seaboard and take charge of all roads which have a strategic value, put them and keep them in splendid condition, reduce the grades, widen them where necessary and strengthen the bridges for the passage of the artillery and heavy trucks.

"I cannot overstate the value of good military roads; the railroads having nothing like their elasticity. Given roads and plenty of motor vehicles, 1,000,000 men, with artillery and supplies, could be shifted 200 miles in 24 hours. There is nothing like a motor vehicle on good roads for the rapid transportation of men and materials."

### HORSE DEMAND HELPS MOTOR SALES

Austin, Tex., Aug. 30—One of the important factors that promises to bring about a considerable increase in the sale of motor cars in Texas and throughout the surrounding country is the sale of thousands of horses and mules to England, France and Italy for use in the war. In

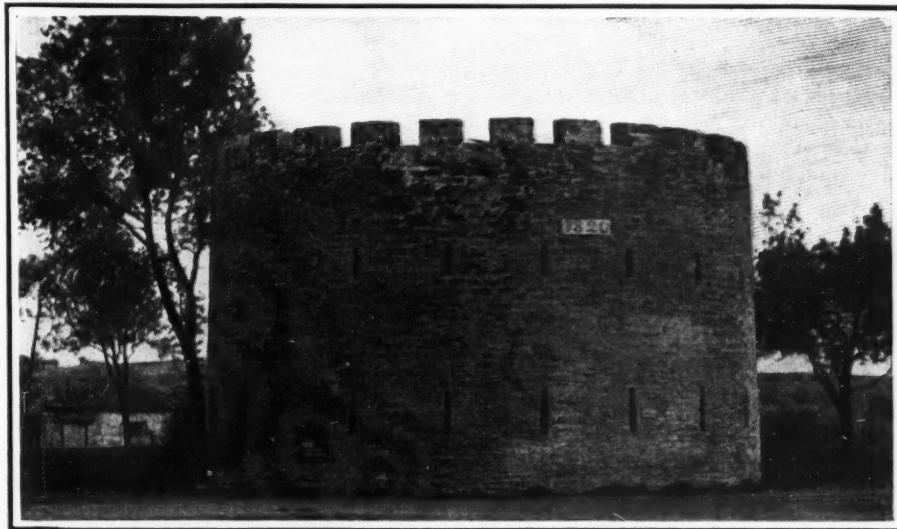
this state, the ranches and farms are being rapidly depleted of their best horses and an appreciable rise in prices of the animals, due to the prospective and actual shortage, is already apparent.

Buyers for the allied armies are stationed at every horse and mule market in Texas and orders for the animals are being filled as fast as local traders can assemble the horses and they can be passed upon as to their fitness for war purposes.

Only recently a dealer at Fort Worth received an order for 30,000 horses.

If the drain of first-class stock continues much longer, it is predicted that prices will go soaring and that old Dobbin will be supplemented by power traction to a great degree. The prices of delivery and other grades of horses advance along with the higher cost of first-class animals. This brings the merchant closer to the commercial vehicle dealer. The same condition applies to the man, who could make use of the motor truck, and to the farmer and city man who heretofore have used the horse for pleasure and business purposes.

# See America First — • • • See America Now

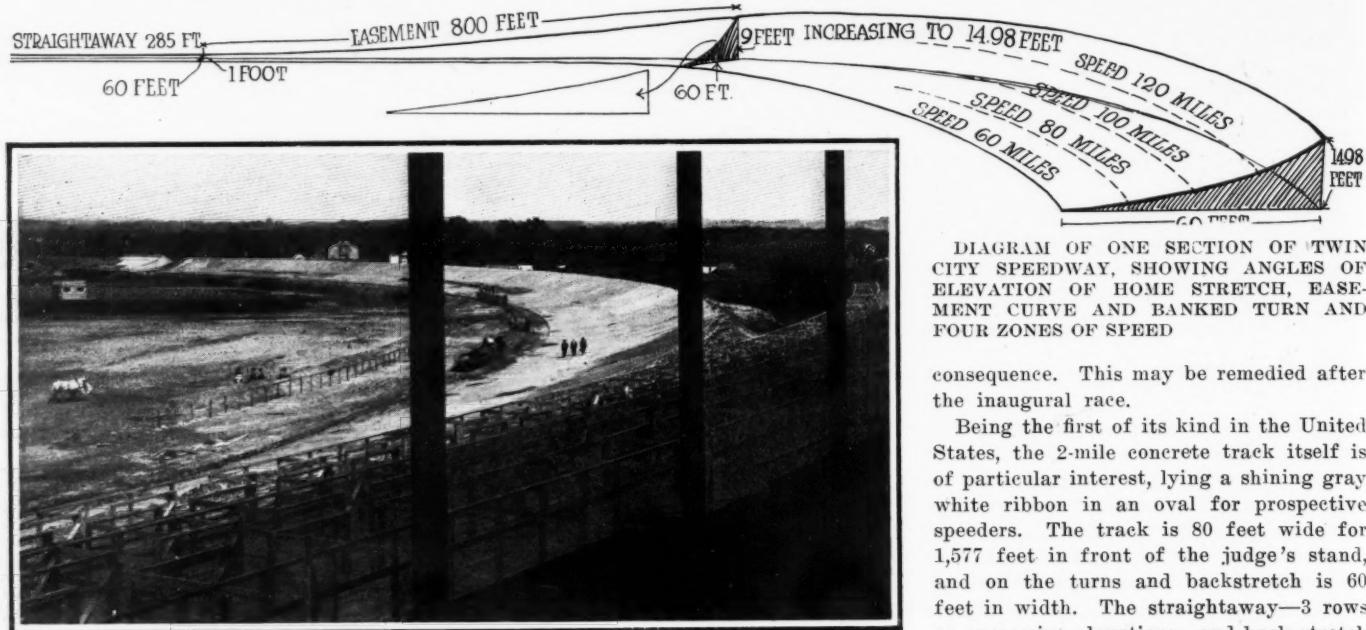


EDITOR'S NOTE—This is the forty-first of a series of illustrations and thumb-nail sketches of scenic and historic wonders of America to be published in Motor Age for the purpose of calling the attention of motorists to the picturesque points of interest in their own country.

No. 41—FORT SNELLING, MIDWAY BETWEEN MINNEAPOLIS AND ST. PAUL  
 NINETY-FIVE years ago, when the Gopher state was numbered among the far-western tracts by colonial America, the old fort shown above was built on the banks of the Mississippi river about midway between the present Twin cities, and named Fort Snelling. Two days hence this old structure will stand sentinel over a twentieth century invention—a 500-mile race—for the Twin City motor speedway adjoins this old historic relic of pioneer days in the northwest.

# Twin Cities Ready to Dedicate New Concrete Speedway

Practice Starts for Saturday's 500-Mile Race, Dario Resta, in Peugeot, Averaging 100 Miles an Hour in One Circuit of 2-Mile Course



ONE OF THE TURNS OF THE TWIN CITY SPEEDWAY FROM THE MAIN GRANDSTAND

MINNEAPOLIS, Minn., Aug. 31—The third 500-mile race of the 1915 season will be staged midway between Minneapolis and St. Paul Saturday when the new Twin City speedway, the first concrete track with parabolic curve banking to be constructed in the United States, will be dedicated.

Nineteen cars have been entered in the inaugural struggle for \$50,000 in prize money and the star drivers of the country will be at the steering wheels. In fact, the Twin City race has attracted the same talent as did the 500-mile events run on the Indianapolis and Chicago speedways.

H. J. Tremain has bought the Henderson Duesenberg and has picked Ralph Mulford to drive it so that it looks as if Mulford will be at the wheel of an American car instead of a French Peugeot as originally planned. The two foreign Peugeots which Aitken and Wilcox are slated to drive, will not dock at New York until tomorrow and may not reach Minneapolis. In that case the Indianapolis drivers will act as Stutz relief. Oldfield also is late with his Delage and may require special elimination trial early Friday.

#### Eliminations Postponed

The elimination trials, which were scheduled to start yesterday, were postponed until tomorrow in order to give the workmen an opportunity to clear up the debris. The track is open for practice, however, and several cars were out yesterday and today. The best time made was Dario Resta's trial lap today when he averaged 100.09 miles per hour. De Palma, in his Mercedes,

#### ENTRIES FOR TWIN CITY DERBY

Car	Driver
Peugeot	Dario Resta
Peugeot	Ralph Mulford
Peugeot	Bob Burman
Peugeot	Johnny Aitken
Peugeot	Howdy Wilcox
Mercedes	Ralph de Palma
Stutz	Gil Anderson
Stutz	Earl Cooper
Stutz	Unnamed
Duesenberg	Eddie O'Donnell
Duesenberg	Pete Henderson
Duesenberg	Billy Chandler
Duesenberg	Unnamed
Delage	Barney Oldfield
Mercer	Otto Henning
Sebring	O. F. Haibe
Ogren	Tom Alley
DuChesneau	W. W. Brown
Johnson Rotary	Littlewood

was a close second with 99.86 miles per hour. Yesterday's best time was 98.9 miles per hour, Gil Anderson's Stutz turning a lap at that speed. The driver was given \$100 for thefeat.

The practice thus far has showed the track not to be as fast as expected. The promoters believed that a speed of 100 miles an hour could be maintained upon it but the prediction is common that the winner of the 500-mile race will not average much better than 90 miles per hour. The concrete track is wavy and the pilots say that it is a difficult course to drive as a

DIAGRAM OF ONE SECTION OF TWIN CITY SPEEDWAY, SHOWING ANGLES OF ELEVATION OF HOME STRETCH, EASEMENT CURVE AND BANKED TURN AND FOUR ZONES OF SPEED

consequence. This may be remedied after the inaugural race.

Being the first of its kind in the United States, the 2-mile concrete track itself is of particular interest, lying a shining gray white ribbon in an oval for prospective speeders. The track is 80 feet wide for 1,577 feet in front of the judge's stand, and on the turns and backstretch is 60 feet in width. The straightaway—3 rows on successive elevations—and back stretch are 285 feet long and practically flat.

From the ends of the two stretches are easement curves of 800 feet entering into the high turn or leaving it, at a 9-foot height. These four easements allow the drivers to rise gradually into the total angle of 14.98 feet, or the extreme height of the turn at the outside end of the oval, and to drop down again into the stretches. The change from the end of the easements into the high curve is a 1 per cent grade.

The safety zone in front of the stands is 40 feet and inside the parking boxes is set aside an equal distance. The retaining wall on both sides of the track is of concrete, 2 feet above ground. The tire protection in front of the stands is 10 feet netting strung on iron posts set in the retaining wall.

The track was built as follows: A sand water-settled base ranging from 18 inches to 8 feet in thickness was slushed in. This was rolled in layers by a 12-ton roller. Above this was laid a concrete base reinforced with flat expanded metal 6 inches thick, and a 1-2-4 mixture of cement, sand and stone. This was covered with an inch of 1 to 1 trowel finish cement and sand.

The forty pits are each 8 by 15 feet, abutting the track retaining wall and separated by wood partitions.

#### Grandstands and Parking

The total seating capacity provided is 71,616. Four grandstands are in front of the pits, a fifth is at the end of the backstretch and another near the turn into the homestretch. The grandstands seat 48,796, the bleachers more than 10,000, and the boxes over 11,000. The stands are of frame construction and have a carrying capacity of 150 pounds to the square foot.

Motor cars gain entrance to the grounds at six points and to the oval by three subways. Back of the main grandstand is free parking space for 15,000 cars. In the oval are 2,000 reserved parking spaces, and unreserved room for 20,000 more. The subways are reinforced concrete, 60 feet long and 60 feet wide. For foot passengers from the street railway lines at the back-stretch, is an additional subway, 12 feet wide.

The exact cost of the track and equipment will not be known until an audit is made, but President F. H. Wheeler gives estimates as follows: land, about 342½ acres, \$175,000; grading, \$100,000; track, \$250,000; stands, \$150,000; fences, \$100,000; tunnels, \$70,000; buildings, \$25,000.

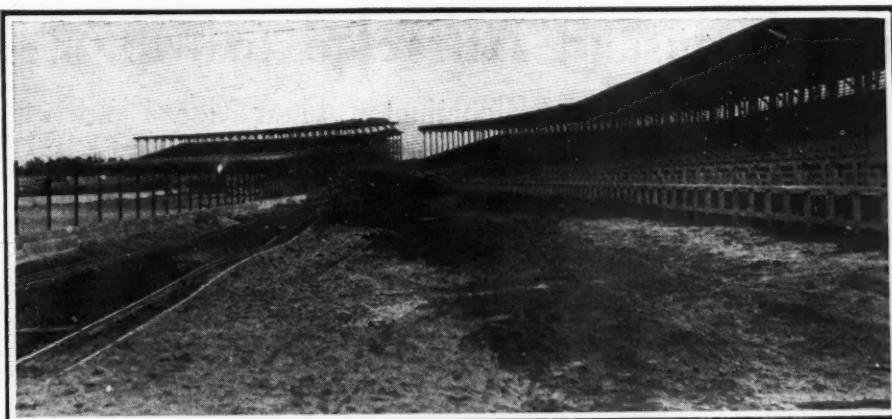
Opinions vary as to what speed may be made at different sections of the track. Mr. Wheeler makes a high estimate on the lower side of the curves. The engineer, W. D. MacLeith, divides the track into four sections, with slight easements between, making an allowance for four cross sections of 60, 80, 100 and 120 miles per hour, the latter on the upper side of the curve.

The track, in cross section, is an inverted parabola with bulging curves forming perfect spirals with the banks that is expected to allow drivers to make full speed at the turns, the same as on the straightaways.

In constructing the speedway, more than 1,500 men were employed, 300,000 cubic yards of dirt were moved, 40,000 barrels of cement were laid, 2,000 gallons of paint were bought and 4,000,000 feet of lumber were cut up.

#### DETROIT FACTORIES BUSY

Detroit, Mich., Sept. 1—Car production in the Detroit factories continues unabated. From all factories the same report that of not being able to meet dealer's demands. The daily Dodge output is 235 to 250 cars. Scripps-Booth reports another cable order from England of 500 cars. Chalmers shipped two trainloads to its New York branch last week. The week has been featured by the number of London dealers looking for agencies.



VIEW OF THE SURFACE OF THE EASEMENT CURVE OF THE TWIN CITY SPEEDWAY

## De Palma is Victor in Kalamazoo Race

Italian Wins 100-Mile Contest With Stutz Without Stopping from Starting Bomb to Finish

KALAMAZOO, Mich., Aug. 28—Covering one hundred laps of the 1-mile dirt track at an average of 65.32 miles per hour and without a stop at his pit, Ralph de Palma this afternoon captured the second annual Kalamazoo 100-mile race and \$1,000 in prize money with his Stutz. The Italian's time for the century was 1 hour, 33 minutes, 31.4 seconds, 58 seconds faster than the mark in last year's event.

Bob Burman, who won the Kalamazoo race in 1914, was forced into second place, his Peugeot finishing more than two laps behind the Stutz. In the early stages of the contest de Palma and Burman engaged in a spectacular wheel-to-wheel fight for the lead but on the twenty-seventh lap, the Peugeot blew a tire and the Stutz went to the front never to be headed.

Billy Chandler, driving a Duesenberg, was third. Fourth and fifth places were annexed by Patrick's Mercer and Ball's Buick. There were six other starters—Burt's Stutz Special, Kline's Cornelian, Hursh's Submarine Special, Hale's Buick, Buzane's DeDietrich and Valdez's Buick.

There was but one accident to mar the event, Kline's Cornelian crashing through

the fence on the thirty-fourth lap, but neither driver nor car was injured.

Ideal weather prevailed and a crowd of from 12,000 to 15,000 persons witnessed de Palma's victory. The grandstand was filled to capacity and more than 1,000 motor cars were parked around the track.

The Kalamazoo race was the fifth 100-mile contest held under A. A. A. sanction this year, the winners of the others being as follows: Cleveland, Eddie Hearne, Case; Columbus, Bill Endicott, Maxwell; Galesburg, Eddie O'Donnell, Duesenberg; and Burlington, Bob Burman, Peugeot.

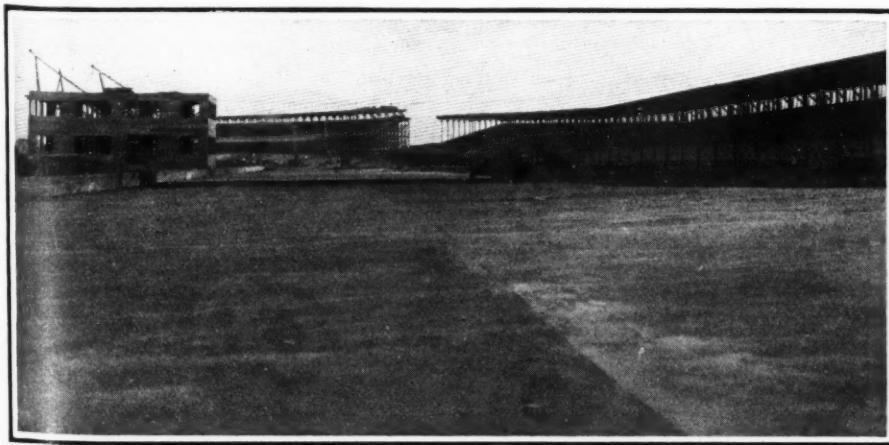
#### JAPAN TO SEE MOTOR RACES

Los Angeles, Cal., Aug. 30—The fame of the Mercer in racing has spread to Japan, and now the land of the Mikado is to have a fast racing team of its own. Two Mercer raceabouts were recently sold to Fred J. Fujioka, of Los Angeles. This Japanese "Bill Pickens" bought the cars to head a racing stable which he will soon take to Japan, where a circuit of speed contests has been arranged. The racers are to be piloted by Japanese drivers, W. T. Watanabe and H. Sakamoto. The first Japanese event will be a series of track races to be held in Tokio in commemoration of the anniversary of the coronation of the emperor.

#### PACKARD BUYS MORE LAND

Detroit, Mich., Aug. 30—Through the purchase of 12½ acres of ground from different parties, the Packard Motor Car Co. now owns over 100 acres of real estate. The purchase price of the land was about \$75,000. To what use this property will be made has not yet been definitely decided, although it may be assumed that new buildings or additions to the plant will be started soon.

The company's present factory, with equipment, represents an expenditure of \$1,500,000.



SAFETY ZONE BETWEEN GRANDSTAND AND TRACK AT TWIN CITY SPEEDWAY

# Fifty Thousand Attracted to Motor Tractor Exhibition

Illinois Farmers Make Bloomington Their Mecca and See Modern Genii, Gasoline, Furrow 60-Acre Field in 2 Hours of High-Speed Plowing



MOTOR TRACTORS IN ACTION AT EXHIBITION HELD AT BLOOMINGTON, ILL., LAST WEEK

BLOOMINGTON, Ill., Aug. 30—Seventy tractors by actual count, representing nearly as many manufacturers of the United States, gave a demonstration in plowing on a tract of 700 acres near here last week, which in point of attendance, number of machines engaged, and number of sales, has had no counterpart in the history of the industry. Clear and cool weather which marked the entire week, was an important factor in the success of the exhibition.

A magnificent sight was afforded when thirty-two tractors, in perfect alignment, started across a 60-acre field of green stubble, with thousands of farmers following in the rear. Within 2 hours after the great cavalcade commenced operations, the green-tinted field had changed to jet black and the 60-acre tract was ready for sowing. It was the climax of the middle west tractor farming demonstration which was successful far beyond the anticipations of the promoters.

Carl Vrooman, first assistant secretary of agriculture, was present from Washington, D. C. He gave an address before a mass meeting of the tractor manufacturers in which he stated that the tractor had come to stay, as cheap power was as important to the farmer as to the manufacturer. When the farmer is behind in his work, he can always count upon the untiring tractor to rush the plowing and make up for lost time. Mr. Vrooman stated in conclusion that the federal department regards the development of the tractor industry as a national asset and is endeavoring to co-operate in extending this line of endeavor.

Another distinguished visitor was Edward Molner, of Budapest, sent here by the Austrian government to purchase several thousand tractors and other pieces of farm machinery. He purchased sixty tractors of 100 horsepower

for immediate shipment and expects to place many more orders before he returns to his native land. John C. Couples and W. C. Brown, of the United States Steel Corp., Pittsburgh, Pa., also were in attendance during the week. They came to purchase a number of tractors for farms operated by that corporation.

Nearly every state in the union was represented at the Bloomington demonstration, there being numerous instances of farmers traveling 2,000 miles to witness the performance.

## ROUTE INTERNATIONAL PAVEDWAY

Chicago, Aug. 27—At an enthusiastic meeting held here yesterday, the following route was adopted for the International Pavedway, the permanent motor road that is to connect Detroit with Laredo, Texas:

Detroit, Jackson, Battle Creek, Kalama-

zoo and Dowagiac, Mich.; South Bend, Logansport and Lafayette, Ind.; Danville, Decatur and Springfield, Ill.; St. Louis, Mo.; Little Rock and Texarkana, Ark.; and Dallas, Fort Worth, Austin, San Antonio and Laredo, Tex.

According to the promoters of the thoroughfare, the road is to be made permanent in character by the use of brick, concrete, asphalt and macadam and when completed will represent an investment of about \$20,000,000. The road is to be built and maintained by general, state and county appropriations.

Completion of the organization was effected by the election of officers and directors, with the exception of president. That office will be filled by the directors. Officers elected are:

Vice-president—H. B. Krenning, St. Louis, Dorris Motor Car Co.

Managing director—H. G. Spaulding, South Bend, Ind., vice-president National Parks Highway Association.

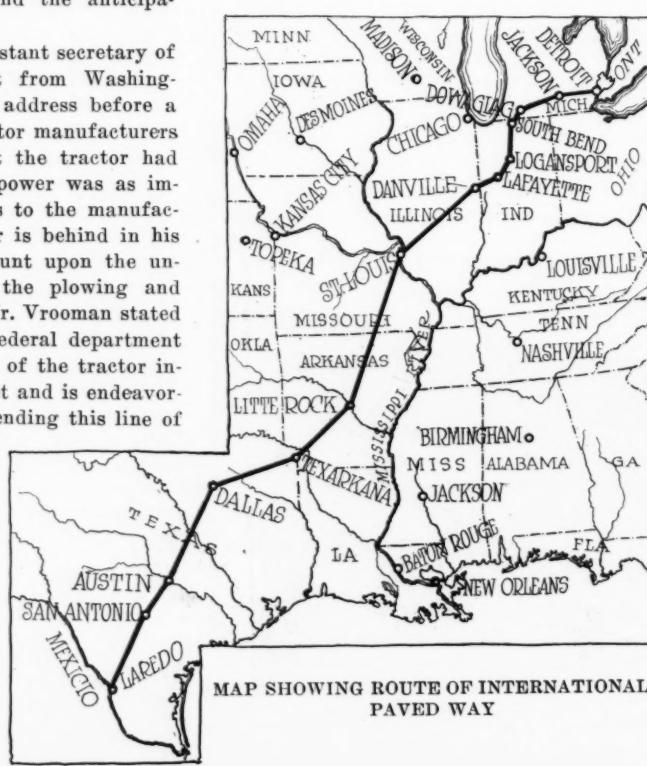
Secretary—L. M. Vaughn, Danville, Ill., secretary Illinois-Dixie Highway Association.

Treasurer—Harvey C. Adams, Danville, Ill., secretary Vermilion Building and Loan Association.

Among the directors are William Sparks, Sparks-Withington Co., Jackson, Mich.; S. D. Walden, Packard Motor Car Co., Detroit, Mich., and C. C. Hanch, Studebaker Corp., South Bend, Ind.

"More than \$100,000 has already been subscribed by motor clubs, chambers of commerce, rotary clubs, advertising clubs and other organizations to aid in the promotion of this highway," said Managing Director Spaulding. "I have just completed a tour of the proposed route and find the one selected in every way practical for all-the-year traffic. Roads already improved in the counties through which we pass will be used as much as possible. South of St. Louis the roadway will be 12 feet wide; north of that city it will be 16 feet wide."

Permanent headquarters of the association will be established either in Danville, Ill., or St. Louis.



# Citizen-Soldiers and Military Motors

Fifteen Gasoline-Driven Vehicles, Donated for Use in Plattsburg Maneuvers, Tested by Uncle Sam in a Attempt to Modernize His Fighting Forces

By J. W. Schipper

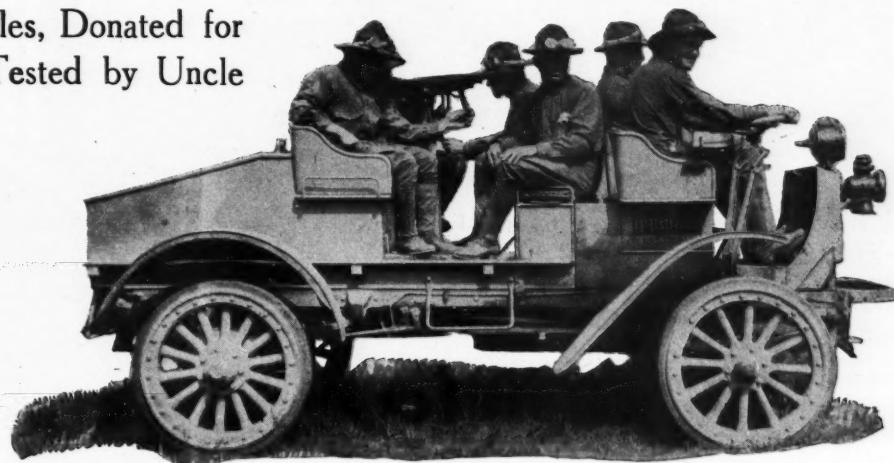
PLATTSBURG, N. Y., Aug. 28—America's citizen-soldiers, 1,300 strong, have assembled at Plattsburg to teach Uncle Sam a lesson in military preparedness and to learn the rudiments of modern warfare as waged by the gray legions of the kaiser and the allied armies of France, Russia and Great Britain.

They are unskilled volunteers in time of peace that hope to be efficient soldiers in time of war. Individual patriotism was the bugle that called them here, called them from banking house, law office, physician's study and mercantile establishment to play the humble role of rookies in this, the first camp for military instruction ever established in the United States. Millionaires and mayors, captains of industry and scions of wealthy families are wearing the khaki of Mars at Plattsburg, eating the mess of the hardened regular and drilling on the plains along the Hudson.

There is an odor of gasoline in Camp Plattsburg. The hum of motors and the bark of exhausts are heard amid the rattle of musketry and the tattoo played by the hoofs of cavalry horses. Realizing Uncle Sam's lack of modern military equipment as well as their own limitations as twentieth-century warriors, the citizen-soldiers have brought to this school of instruction the vehicles and weapons that they must learn to use and which the United States must adopt for its army if its fighting force is not to be almost as antiquated as the phalanx that Alexander hurled at the Persians and the legions with which Caesar conquered the world.

Assembled at the military instruction camp are fifteen motor cars which in all probability will prove to be the entering wedge for modern motor equipment for the United States army. Closely as is watched the progress of the representative business men who have traveled east from California and north from as far as Georgia to gain some knowledge of what is required of an officer in the army, the work of the motor equipment at this camp is receiving even closer attention from the regular army officers gathered here.

This camp is no child's play. There is no slighting of the



MACHINE GUN CAR AND CREW AT CAMP PLATTSBURG

*For a dash to the front or for covering engineering corps while at work, this type of vehicle has been found very efficient in the battles across the Atlantic*

work required of military men in the enemy's country. From the first call for reveille at 5:45 a. m. until taps are sounded at 10 p. m., every minute of the day is scheduled and planned to occupy fully the time of the 1,300 business-men-rookies, many of whom are millionaires, or men high in public and private life. These men represent one important feature of the experiment which is being conducted through the encampment. With the training received here, these men secure at least an inkling of the knowledge necessary to become one of the important units of a modern military machine. By this means, men who eventually will be able to qualify as officers in volunteer regiments are produced.

#### New Implements of Mars

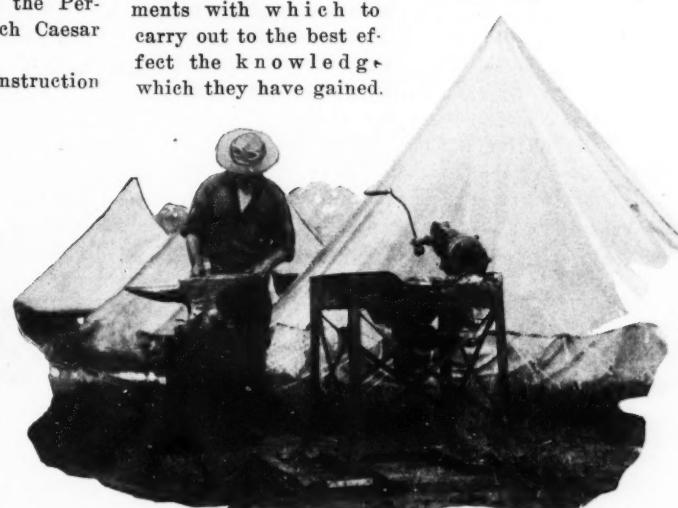
But there is another side to the work at this camp. It is of course first necessary to have trained men, but it is just as necessary that they have the tools and implements with which to carry out to the best effect the knowledge which they have gained.

There are two classes of implements which the European war has shown to be predominantly necessary in these days of trench warfare. They are machine guns and motor vehicles.

Machine guns and motor vehicles go hand in hand. They are both units which make imperative and provide quick mobility. With machine guns, larger supplies of ammunition must be carried. The guns are heavy, relatively speaking, and wherever roads are good, cannot be transported to better advantage than by gasoline. The armed motor car generally is equipped with one or more of these weapons. Up to the present time, it was considered that three machine guns were sufficient for a regiment of 1,000 men. The forces in Europe at the present time in many cases are armed with more than twenty-five machine guns to a regiment. Not long ago it was reported that 500 English troops were 4 days in taking a German

trench, suffering heavy losses only to find in the captured trench five machine guns and fifteen soldiers.

The work of the motor truck and passenger car in warfare does not need to be reviewed. Fitted with transport bodies, gasoline-driven vehicles have carried hordes of troops across distances never before attempted by an expeditionary force of any numbers. Ammunition for heavy guns has been supplied in such great quantities and with such unfailing regularity that unsurpassed artillery work has been accomplished by both the allied and Teutonic forces. For scouting, field telegraph, wireless, observation posts, searchlights,



FIELD REPAIR SHOP FOR DAMAGED WAR CARS

*In the day of motorized armies, the mechanic who can fix a carburetor or magneto is more valuable than the man who shoulders a gun*



MODERN INSTRUMENTS OF WAR  
At left, Autocar searchlight wagon with detachable apparatus in the foreground. In oval, sending wireless messages  $\frac{1}{4}$  of a mile distant from motor truck that generates necessary current



picket work and any number of other services, the motor car has proven itself indispensable. Small wonder is it, therefore, that the United States government at last has instructed its officers to gather reliable data as to the performance of different types of cars and bodies with a view of learning exactly what would be required to equip our army?

The Plattsburg bivouac is the first experiment in motor-transported machine gun units which has ever been conducted by the U. S. army or the national guard since hitherto no funds or opportunities for such experiments have been provided. For this purpose, in connection with the military instruction camp, a motor machine gun troop has been organized. From it, Uncle Sam hopes to learn what types of cars and trucks are best suited to the purpose, how many guns and men can be transported to advantage upon one truck, the speed at which they can be operated, the sort of country they can be operated in most effectively, and other data which at the present time is little better than guessed at.

#### Fourteen Cars in Troop

Fourteen of the fifteen cars at the camp are included in the machine gun troop.

There are about seventy men in the troop, lawyers, bankers and business men from New York, Boston, Philadelphia, Pittsburgh, and elsewhere. They are graduates from Harvard, Yale, Princeton and other universities. With this troop, beside the fourteen cars, there are twenty machine guns and two 1-pounders. Captain William J. Smedberg, Jr., Second United States Cavalry, the machine gun expert of the United States army, has accompanied this motor gun troop as officer of instruction and has taken command at Plattsburg. The equipment and maneuvers of these cars are under the direction of this officer and Capt. Raynal C. Bolling, general solicitor of the U. S. Steel Corp., who was instrumental in organizing the troop. The necessary funds have been contributed by Judge Gary, chairman of the board of the U. S. Steel Corp.; George W. Perkins, J. P. Morgan, Brown Bros., Potter, Choate and Prentice and White, Weld & Co.

While generous financial support has been given by the business men mentioned, the experiment has been rendered possible by the assistance of motor car manufacturers of this country, who are interested in learning what type of vehicle they would be required to furnish the government in motorizing our military equipment.

The Autocar Co., Ardmore, Pa., has supplied four cars and drivers—an officer's reconnaissance car, a searchlight car with a very powerful instrument, which can be operated anywhere within a  $\frac{1}{4}$ -mile radius of the car, a motor ambulance, and a military transport.

The International Motor Co. has provided two of its latest model trucks, one of  $3\frac{1}{2}$  and one of 1-ton capacity. Both of these are armored and mount machine guns and 1-pound rapid firers.

The Cadillac company has provided the armored car with revolving gun turret and the field ambulance, which were sent across the continent to San Francisco from Chicago. They were shipped here by express for the experiment.

The Garford company has supplied a truck and driver; the Simplex company, one of its 100-horsepower passenger car chassis; the Mitchell Motor Car Co., one touring car and two bodies, such as it has built in great numbers for the French army; and the Buick company, one of its light trucks.

#### Armor Plate for Trucks

The Carnegie Steel Co. has supplied armor for three of the trucks; the Hay-Buddon Mfg. Co., of Brooklyn, has provided a field-repairshop anvil, and the Vought and Williams Co., of New York, a forge and vise. In the way of equipment, the Pyrene Mfg. Co. has provided fire extinguishers, and the U. S. Tire Co., extra tires for most of the cars.

This is the equipment with which this experiment is being carried on. On each

of the cars of large enough capacity there is mounted a machine gun. Each of these cars has its crew, which can quickly man it and travel over the road for scouting purposes, transport work, or whatever comes within the range of the possibilities of the body with which the car is equipped. The lessons to be learned are being slowly grasped and the bodies with which the cars are equipped are copies in nearly every case of those which are used to such good effect on the fields of France. On the Garford  $1\frac{1}{2}$ -ton truck chassis, for example, there is mounted an all-around utility body which either can be used as an ambulance or for a transport and machine gun car.

#### Carries Six Wounded Men

When used as an ambulance, the machine gun is removed, to bring the car under the protection of the Red Cross. At that time the car can go right to the front and pick up wounded men as far as battle conditions will permit. It has a capacity of six stretchers, which can be carried on racks supported within the car on uprights, as will be noted in the illustration. The body, however, is more of the transport and machine-gun outfit than an ambulance. With the machine gun mounted on the rear platform, and with the side seats for the crew, a speed of 35 miles per hour can be secured. If desired, the seats can be removed and the men crowded together to the utmost capacity of the vehicle. When not near the firing line, the machine gun is removed and placed in a bag, which is carried in a space provided for it be-

neath the side seat. The stretchers fold up, the stretcher racks are out of the way and in a word, all-around utility is the chief asset of this type of body. It can be a field ambulance, a motor transport wagon, an offensive machine gun unit, a rear guard unit, a reconnoitering car, or fulfill any duty of this nature in ordinary military usage.

#### Buick Offers Rapid Transport

On the Buick chassis, which is of 1,500-pound capacity, there is mounted a type of body which was found very useful on the battlefields of France when it became necessary to transport quickly ten or a dozen men from one part of the scene of operation to another. It is a sort of open express design, which can be provided with armor plate if necessary, and carries on the rear platform a machine gun mounting for either offensive or defensive work. A car of this kind can dash about from one place to another at a speed of from 35 to 40 miles per hour, and, with the crew of the machine gun, could withstand a considerable attack. In other words, this car could be sent on an expedition such as the blowing up of a small bridge and while the men in the wagon were setting the explosive and arranging the fuse, the machine gun could be utilized to hold off the enemy for a sufficient length of time to accomplish the work.

The Cadillac military hospital and armored cars have been described before. They belong to the Northwestern Military Academy of Highland Park, Ill., and are part of the contingent which recently completed a tour to San Francisco. The ar-

mored car can attain a speed of 40 miles per hour and is equipped with a revolving gun turret. The present car is equipped with pneumatic tires with the spare tire exposed at the side. In time of service, these no doubt would be replaced by solid tires. The military field hospital in its present condition has a machine gun mounting on the rear, which, of course, would have to be removed if the car were used for ambulance work. One of the points of this car's equipment are the roller stretchers. These take up so much room that they could not be used to advantage were there wounded men in any quantity.

#### Mack a Land Gun Boat

One of the surprises of the camp has been the performance of the 3½-ton Mack truck. It is equipped with demountable armor plated sides and has mounted on its body two machine guns and a 1-pound rapid-fire gun. It acts almost as a land gun boat. On the march to the camp, 400 miles from New York, this truck, with its equipment, which weighed up to 8 or 9 tons, was speeded to 35 miles per hour, and it did go through some weak bridges. In addition to its own load, consisting of more than thirty men, the three guns, 15,000 rounds of machine-gun ammunition, 12,000 rounds of 1-pound shells, 800 rounds of 3-inch shrapnel for a field piece, two independent searchlight systems, one of gas and the other of electric, two independent gasoline systems, and the armor plating, this truck towed a limber and the 3-inch field piece, which is of the latest design and capable of firing 9,000 yards or over

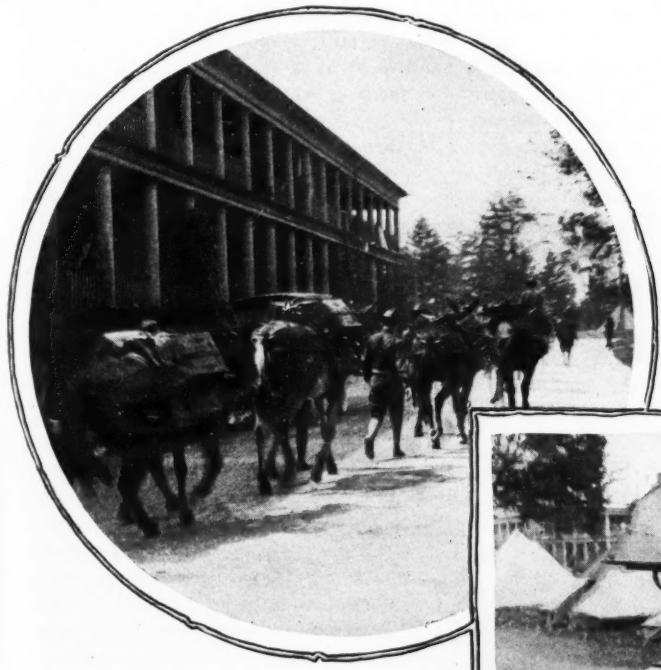
3½ miles with accuracy.

The other Mack of 1-ton capacity is equipped with pneumatic front and solid rear tires and a platform body upon which are removable sides and tail piece covered with Harveyized steel armor. This is capable of resisting

rifle fire at 500 yards. Just for an experiment, the plates were removed and the men opened fire with the machine guns at 200 yards. The hail of bullets failed to penetrate the plate, simply splashing off, but the plates themselves rapidly became crystallized under the vibration set up by being struck blows equivalent to the falling of concentrated 5-ton weights at the rate of over 300 per minute. As a result, they soon cracked and fell apart, although at no time did a bullet penetrate through the steel. The steel is guaranteed against rifle fire, however, at 500 yards, with the latest steel bullets. The truck is equipped to carry a Maxim rapid-fire gun and a Colt machine gun with full crews for each of these and 15,000 rounds of ammunition. Both the armor plate and guns can be removed on short notice to be set up in a field position. The bodies on both these Macks were designed by Alfred F. Masury, chief engineer of the International Motor Co., who spent 3 months making a study of military motor equipment in Europe. A feature is the tubular centrifugal radiator behind the motor in a steel bullet-proof frame.

#### Quick Retreat Necessary

On the Simplex 100-horsepower car is a body which may be called a machine gun express. This body carries a driver for the car and has just sufficient room for a machine gun and crew. It is capable of speeds in excess of 60 miles per hour and can be used to dash into the enemy's lines, operate the machine gun for a short time and then before it can be reached by artillery, make a hasty retreat. It is such vehicles as these that have been of great use on the other side of the Atlantic for making quick reconnaissances. The drivers of these cars have to be careful that they take a position in such a place as to be readily turned around for retreat, and it is the difficulty in which they are often found of being caught in a place where they cannot turn around that has caused the European authorities to design a car which will travel as rapidly in one direction as in another; in other words, a car geared the same on reverse as ahead, and with double steering.



THE OLD AND THE NEW WAY  
Where mules formerly carried the machine gun, that weapon now is mounted on the rear of a motor car and is ready for instant use



The four Autocars have special bodies which are similar to those now in actual use on European battlefields and mounted on the standard Autocar 2-ton chassis. The officers' reconnaissance car can carry a squad of officers on a tour of inspection of the lines or for any service at all where it is necessary to take three or four men quickly along the front. It fills the place of the officer's horse, doing the work much more rapidly wherever it is possible to remain on the road. The searchlight car is the same as that recently used in the maneuvers at Fishkill Landing, N. Y. The searchlight wagon attached to the car can be wheeled  $\frac{1}{4}$  mile away from the truck which contains the generator for the electric current. In this way the searchlight can be taken to the brow of the hill while the power plant remains concealed in the valley below. The motor ambulance is the same as that attached to the Canadian contingent now fighting in Flanders and the military transport is a body intended to convey men to and from headquarters or about different parts of the line. Any of these wagons can be used for transport work, the ambulance having carried twenty-eight men at Fishkill Plains, besides having had some actual ambulance experience in working over two drowning men who were caught in a stream which was thought to be fordable. This ambulance has traveled up to 40 miles per hour. It has a water tank underneath with a tap on the rear with room for six prone and eight sitting up, besides the crew, and on the side of the body there is a drawer containing enough surgical apparatus to perform a minor field operation.

#### Mitchell Provides Officer's Car

For an officer's utility car, there is a Mitchell 6-16, which has a speed of 60 miles per hour. It is a standard seven-passenger touring model. There is also a Locomobile touring chassis and a Ford chassis, each capable of acting as machine gun express cars. The remaining piece of motor apparatus with the machine gun and artillery corps is a Galaudet tractor biplane with a 100-horsepower Gnome engine for scout work.

One other piece of motor apparatus is at the camp. This is a wireless truck mounted on a White 1½-ton chassis, equipped with a special body to take care of this work. This apparatus can be set up for action in 12 minutes and it can send messages 800 miles. The vehicle carries an entire crew and has a generator and complete outfit for sending and receiving wireless messages on the truck. It has a mast for the wireless antennae, which are of the umbrella type. The mast is in nine sections and is 85 feet high. This apparatus belongs to the United States regular army signal corps and has been in use for a little over a year.

At the camp, there is ceaseless



MOTOR AMBULANCE AT PLATTSBURG

*In a drawer at the side of a Red Cross Autocar is sufficient equipment to permit an army surgeon to perform an immediate operation*

activity. The officers' and transport cars dash from one point to another, on staff and other duties, the machine gun crews bear down upon imaginary enemies in quickly moving machine gun express cars, the artillery is pulled over the rough roads by the trucks containing the gun crews and ammunition and all the time the watchful officers are compiling data on the performance of these vehicles.

It has been hard to secure appropriations for adequate equipment for the United States army, small as it is. The aeronautical branch of our service has been practically neglected. It has taken a European war of inconceivable magnitude to awaken the country at large to the knowledge of how far other countries have progressed in military science and equipment, while we, in the security of probable peace, have paid little attention as a nation to these developments.

Out of the preliminary chaos, however, certain definite facts regarding the uses and requirements of military equipment are beginning to stand forth. The best all-around weight capacity for war cars is not above 1½ tons, except under spe-



cial circumstances; military transport cars must not be merely converted furniture vans or milk wagons, but on the other hand must have special bodies which render them of actual use other than mere vehicles upon which a body of men can pile themselves in traveling across country; with machine gun mounting, many of these vehicles can be made to serve as valuable offensive units; trucks can be used for towing artillery, and with adequate motor-driven apparatus, 100 miles per day is not too much of a journey. The machine gun squad at Plattsburg traveled 100 miles per day for 4 successive days, with twenty machine guns, a 3-inch gun and caisson with limbers for each, full equipment for the men, cooking outfit, provisions and all the necessary paraphernalia. Special body design on sturdy, fast chassis will answer the requirements of all-around service far better than miscellaneous trucks picked up here and there. The bodies confiscated on the foreign chassis have proved to be of small utility as compared with those which have been constructed since the war began.

The military camp at Plattsburg will go a long ways toward teaching the utility of the machine gun express and transport vehicles.



WASHINGTON, D. C., Aug. 28—The tremendous gains made in our export trade in motor cars and parts during the fiscal year ending June 30 are vividly shown in the detailed figures issued today by the department of commerce. The gross figures, published in a recent issue of Motor Age, showed that 37,870 motor vehicles, valued at \$60,254,635, and parts worth \$7,000,000 had placed the total of exports at \$67,254,635, an increase of more than 100 per cent over the foreign sales of the previous 12 months, which amounted to \$33,198,806.

The United Kingdom holds first rank in the volume of its imports of motor cars from this country. During June last, the number of cars shipped to that country was 2,246, valued at \$4,413,387, while in June a year ago the number was only 240 and the value, \$239,274. During the 12 months ended June 30, the number of cars exported to the United Kingdom increased from 7,222, valued at \$5,853,127, in 1914, to 13,934 cars, valued at \$21,149,552.

The shipments to France in June last amounted to 969 cars, valued at \$2,634,338, as against 143 cars, valued at \$88,874, exported in June, 1914. During the fiscal year these exports rose from 1,429 cars, valued at \$924,130, in 1914, to 5,441 cars, valued at \$13,776,752, in 1915.

Italy's imports of cars from this country show a sharp decline from seventeen cars, valued at \$13,801, in June a year ago, to four cars, valued at \$2,893, in June last. Even more marked was the decrease during the fiscal year, 343 cars, valued at \$242,695, being shipped there in 1914, while in 1915 the number was 115 and the value, \$78,265.

There were no shipments of cars from this country to Germany in June last, while in June a year ago forty-four cars, valued at \$56,249, were exported. During the fiscal year, the number of cars exported there decreased from 1,435, valued at \$1,059,249, in 1914, to twenty, valued at \$20,164, in 1915.

Under the heading, "Other European Countries," large increases are to be noted. In June last the number exported to European countries not already mentioned was 1,432, valued at \$2,952,440, while in June, 1914, the number was 242 and the value, \$203,816. During the 12 months' period, the number increased from 2,928, valued at \$2,337,733, in 1914, to 4,249, valued at \$10,720,541, in 1915.

Eight hundred and twenty-seven cars were shipped to Canada in June last, the value being \$631,609, while in June a year ago the number was 513 and the value \$642,024. During the fiscal year the number shipped there decreased from 4,624 cars, valued at \$5,919,776, in 1914, to 4,433 cars, valued at \$4,428,338, in 1915.

Our export trade in motor cars with war-ridden Mexico is not very flourishing. In June last eleven cars, valued at \$13,255, were shipped there, as against three cars,

## John Bull a Spender

### United Kingdom Buys \$5,853,127 Worth of Cars in 12 Months

### Motor Exports for Year Ended June 30 Break All Previous Records

valued at \$4,577, exported in June a year ago. During the 12 months' period the exports fell from 167 cars, valued at \$256,675, in 1914, to 78 cars, valued at \$81,322, in 1915.

#### WAVERLEY TO MAKE TRUCK

Indianapolis, Ind., Aug. 30—It is stated on good authority here that the Waverley Co. of this city, in the future will announce a new electric commercial model of light capacity at a lower price than heretofore Waverley vehicles have been offered.

#### DRUMMOND TO COME FROM OMAHA

Omaha, Neb., Sept. 1—The Drummond Motor Car Co. has been organized to build the Drummond four and six-cylinder cars which will be assembled machines. The Drummond company has been in business for over 20 years and its present plant will be used for assembling these cars.

#### NEW MADISON SIX ANNOUNCED

Madison, Ind., Sept. 1—A new six-cylinder model has been brought out by the Madison Motor Co. It uses the Rutenber block motor 3 by 5, with Remy starting and ignition system, the ignition being the magneto-type distributor.

With 120-inch wheelbase and 34 by 4 inch tires, the car sells as a seven-passenger touring car at \$1,085; as either a five-passenger touring car or two-passenger roadster, at \$985.

#### COURT PROTECTS FORD NAME

Providence, R. I., Aug. 28—In a suit brought in the United States district court by the Ford Motor Co., Detroit, Mich., against the Auto Parts Co., of this city, a perpetual injunction has been issued in this district restraining the name "Ford" on parts and accessories that it makes and markets for Ford cars. The decision is most sweeping and restrains the defendant from advertising its goods under the name of Ford or using the name of Ford on its letterheads, catalogs, signs, etc.

The judge, in his opinion, holds as follows:

"While the defendant has a right to inform the public that he is manufacturing articles suitable for use on Ford machines

he should not be permitted to advertise them as Ford articles; but should be required to describe them in such a way as to indicate that they are not manufactured by the complainant."

This decision is interpreted to mean that dealers in Ford parts and accessories in marketing their products must guard against giving the erroneous idea that the part or accessory is manufactured or marketed under the supervision of the Ford Motor Co.

#### GRANT IN TREADMILL TEST

Chicago, Aug. 27—Running continuously for 30 days on a treadmill placed in the show window of the local distributor, C. J. Simmons, a Grant six covered 14,834 miles on 429.5 gallons of gasoline and 15.75 gallons of oil, a gasoline consumption average 1 gallon to each 34 miles. An average speed of 20½ miles per hour was maintained throughout the 30-day test and the records show that six tires were changed as a result of blowouts resulting from the intense heat caused by the friction developed by the treadmill.

#### NEW PLANT FOR HOLLIER

Detroit, Mich., Aug. 28—The Lewis Spring and Axle Co., Jackson, Mich., manufacturer of Hollier eight, has purchased from the Harris Bros. Co., the plant at Chelsea, Mich., which was formerly occupied by Flanders Mfg. Co., for the manufacture of motorcycles. The plant is completely equipped with machine tools and can be put in manufacturing condition easily. The Lewis concern intends manufacturing complete cars both in this new plant and in the main factory in Jackson. The purchase will practically double the Hollier output, making it possible to manufacture from twenty to twenty-five thousand cars in the two plants.

#### DURYEA IN CROWTHER MOTOR CO.

Rochester, N. Y., Aug. 28—The Crowther Motor Co., of Philadelphia, is planning to establish a plant near this city for the manufacture of motor cars which will sell between \$300 and \$400 and also a truck, both of which will embody a number of new features developed by Charles E. Duryea. The plant will probably be placed just north of Ridgeway avenue, in the town of Greece, and it is expected that it will be finished by January 1. The car will be of the four-cylinder, air-cooled type.

#### DANIELS TO BUILD EIGHT

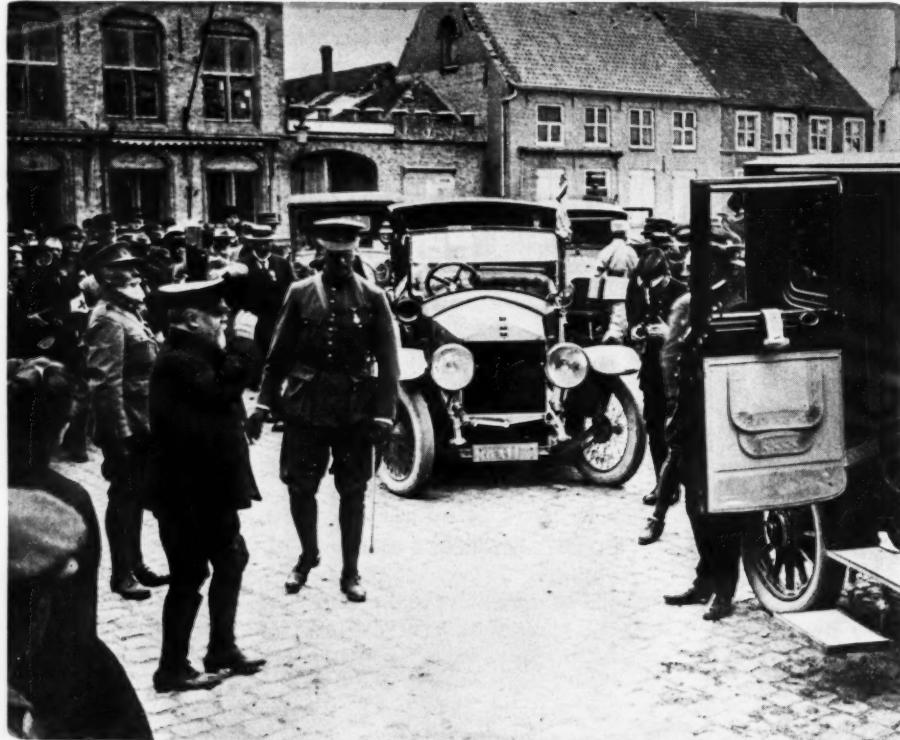
Reading, Pa., Sept. 1—The Daniels eight, a new car produced by George E. Daniels formerly vice-president and general manager of the Oakland company, is to make its debut soon. It is reported to list at approximately \$2,350 and will be built with 127-inch wheelbase and a variety of bodies such as five-passenger, seven-passenger and closed types. The motor is a Herschel-Spillman.



PRESIDENT POINCARÉ (SALUTING) ABOUT TO ENTER HIS CAR ON OCCASION OF A VISIT TO THE FRONT

PARIS, July 25—During the war, President Poincaré rarely travels any other way than by motor car. His long-distance trips are frequent, for hardly a week passes but some trip is made to a portion of the battle front, and there are also visits to the various military establishments in the interior of France.

In addition to his private car, a Panhard limousine, President Poincaré has at his disposal a military reserve of seven cars manned by soldier-drivers. These cars form part of what is known as the ministerial reserve—vehicles for the use of members of the government—and while being under the same general control, there is separate detail management for the president's fleet. The cars are a varied set which have been requisitioned in the motor car stores or from private owners. One of them is a 90 horsepower chain-driven Mercedes, with a torpedo body built by Kellner, of Berlin, which was in the Paris showrooms of the Mercedes company when war broke out. Another is an English Rolls-Royce touring car; a third is a Sizaire-Berwick with a coupe body built by Labourdette specially for the last Paris salon. The other four cars are a Panhard, Delaunay-Belleville and two Renaults.



MEETING OF FRENCH PRESIDENT AND BELGIAN KING AT FURNESS ON THE FIRST ANNIVERSARY OF THE GERMAN INVASION OF THE COCK PIT OF EUROPE

a third is added to the fleet, if the president decides to take his private servants with him. A touring model Rolls-Royce acts as pilot. It generally is driven by a Paris motor car dealer doing military service, and is under the command of a French general on the president's staff.

The general is the only man who possesses any information regarding the nature of the journey. As it becomes necessary, he indicates the route to the driver of the pilot car.

Running about half a mile in the rear is the Sizaire-Berwick, carrying President Poincaré, who usually is accompanied by an officer. Sizaire, the driver, has no knowledge whatsoever as to where he is going; his orders are to follow the pilot. If servants are brought along, they are carried in a third car, the driver of which also is in ignorance of the route to be followed.

Every road in the war district of France is guarded by soldiers who are placed at all cross-roads, railroad bridges, grade crossings, approaches to villages, and strategic points. They have orders to stop every motor car whether carrying military officials or civilians. Thus the pilot car is pulled up from time to time, and the officer in command takes advantage of these stoppages to reveal his identity and order the guards to allow the president's car to pass without interruption. The president thus finds all barricades open and the men standing at attention when he arrives. There is no ceremony in the towns or villages passed through. As there is no intimation in advance that the president is coming, the cars pass through towns without even the authorities being aware of the identity of their notable visitor, Poincaré.

The battle front being divided into sections, each one under the command of some general, the president's car always is taken first of all to the headquarters of this officer. Here he is received by the officer in command, who takes his place by the side of the president, and in many cases

# When the President of France Visits the Trenches

the pilot car is dispensed with. When it is considered desirable to retain the pilot car, one of the staff officers is put in charge of it, and he issues directions to the driver. Various points of interest to the rear of the lines are visited by motor, but when driving becomes difficult or dangerous, the cars are left in a sheltered position and the party proceeds on foot, frequently taking to the communication trenches. President Poincaré insists on seeing everything and often goes up to visit with the men in the front line trenches.

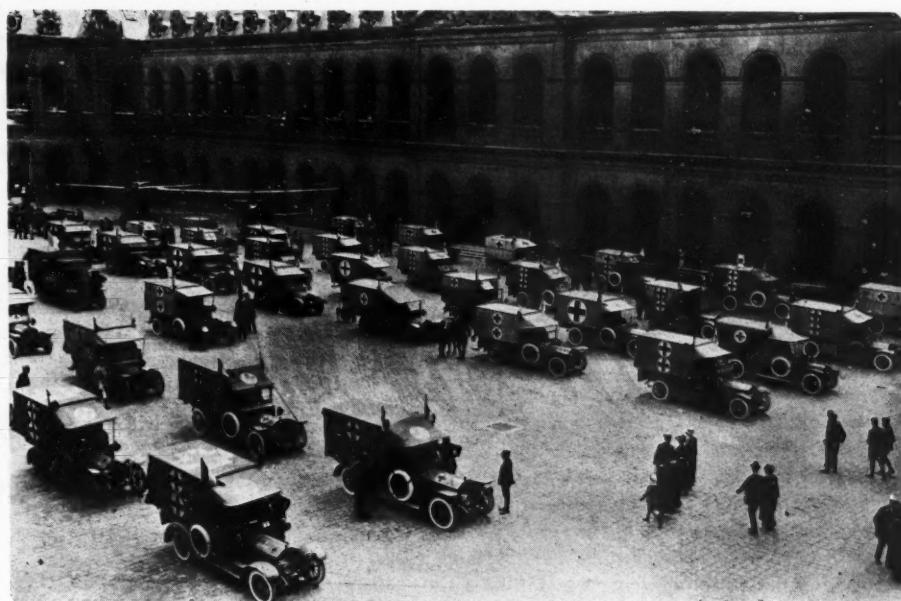
As the enemy has obtained the range of many of the roads near the front, and is always on the look-out for the opportunity to shell cars, special precautions have to be taken. There are certain roads with notices warning drivers to go very slow so as not to raise dust, for this would be an indication to the enemy that cars were passing and shells immediately would fall. In some cases the touring cars, operating close to the front, are thickly covered with branches of trees so as to conceal them from the enemy.

#### Elaborate Cortege Abandoned

In the early days of the war, the presidential cortege was much more elaborate. It comprised eight or nine cars: a detective's car, the pilot car, the president's car, a staff officer's car, a car for servants, a reserve car, and a repair car with reserve supplies of gasoline and tires. Such a fleet of cars cut down speed, attracted attention, and was unwieldy to handle on the road. The reserve car was found to be useless and the repair car unnecessary. With only two cars a speed of 40 to 45 miles an hour can be maintained most of the time, and several months' experience has shown that the fear of roadside stoppages can be dismissed. In the scores of trips he has made to the front, President Poincaré has not experienced an involuntary stop. An ordinary supply of gasoline is carried, for supplies are procurable at the motor depots attached to the various armies in the field.

On the anniversary of the day Europe was plunged into war, President Poincaré undertook a motor trip to the front, and exactly 1 year after Germany invaded Belgium, the French president stepped out of his car on the market square at Furnes and was greeted by King Albert of Belgium. The meeting was impressively simple.

Furnes is the only Belgian town of any importance now left in the possession of the Belgian nation. It has been bombarded again and again by the German long-range guns and is at the present time a city with about a tenth of its original population and a big floating population of soldiers, nurses and doctors. The king and the



AMBULANCES, PRESENTED BY MOTOR UNION OF GREAT BRITAIN TO FRENCH ARMY, PARKED FOR INSPECTION IN PARIS

queen, however, refuse to leave it, despite the dangers and the constant threat of a German advance upon Calais.

On this occasion, President Poincaré visited all the troops in the north of France and Belgium and presented flags to newly-formed regiments. As a proof that President Poincaré is not content to watch the war from the security of the inland towns, his Sizaire-Berwick coupé returned from this trip with a bullet hole through the front fender.

#### Ambulances for French Army

In the brief interval between this trip to the front and a visit to an artillery factory, where experiments were made with new explosives, President Poincaré formally inspected a fleet of ninety motor ambulances presented by the Automobile Association and Motor Union of Great Britain to the French army.

The ceremony took place in the courtyard of the Invalides with the golden-dome of Napoleon's tomb as a background and captured German aeroplanes and cannons as decorations. The audience was capable of being produced by war alone: French soldiers and officers in a variety of uniforms; English staff officers in

khaki; American ambulance men in the same colored cloth; burly Russian officers; Belgians in the new uniforms which appeared to have been borrowed for them, and English civilians in frock coats.

For several months the Automobile Association and Motor Union has been making appeals to its members for motor cars or subscriptions to buy ambulances to be presented to the medical service of the French army. The number of persons who must have parted with their cars is considerable, for the ninety machines inspected at the Invalides represented only a portion of those put into service under these conditions, and they all had been private touring cars. Every European make was represented—English, French, Italian and German, with English predominating. The pleasure car bodies had been stripped off and replaced by a uniform type of ambulance body capable of carrying four men lying or eight sitting.

#### Sent to Rear of Fighting Line

The English effort came to an end with the delivery of the ambulances to the French army authorities. Each car is put in charge of a French military driver and convoys of twenty to forty are formed

with the necessary officers taking their orders from the chief doctor. The ambulances are sent out to different points just to the rear of the battle line, where they are made use of in carrying wounded from the dressing stations to the clearing hospital.

One of the features of the English ambulances is a very successful type of traveling kitchen, mounted on a 30-horsepower Fiat chassis and designed to handle large quantities of food.



PRESIDENT POINCARÉ STOPS TO CHAT WITH SOLDIERS RESTING IN BILLETS BACK OF THE FIRING LINE

## War Makes Tire Work

### Military Trucks Have Trouble With Solid Treads

### High Speeds Necessary on Battle Front Wear Casings

CHICAGO, Aug. 28—American motor car business men, returning from Europe, give many interesting sidelights on the situation so far as motor cars in the war are concerned. Frank V. Springer, head of the export department of the Republic Rubber Co., states that at the Michelin tire factory in France 6,000 pneumatic tires are being produced daily, this company not manufacturing any solids. In the valve plant of the factory 500 high explosive shells are being produced daily, and 8,000 fuses. In addition, the company is producing artillery wheels and is taking up the manufacture of aeroplanes.

Last year the Michelin company made a check extending over a period of 2 months on all of the cars operating in France and Italy, the result of which shows that 80 per cent of all the cars in France last year were fitted with Michelin tires and 70 per cent of those in Italy also. Fully 80 per cent of the tires used in France have steel-studded treads, the French car owner not yet being convinced of the merits of the different types of anti-skid rubber treads used by Americans.

In northern France considerable difficulty has been experienced in the solid tire field by tires on military trucks separating between the tire and the base. This is largely due to the heavy loads carried and the high speeds, it being quite common for trucks overloaded to be driven 140 to 150 miles a day. This means higher speeds than heretofore necessary in truck use, and has proved disastrous to tires. Tire makers at the present time are trying to cope with the situation.

In Italy factories are exceptionally busy, Fiat devoting the majority of its time to the production of motor trucks which is at the rate of 40 per day at present.

### U. S. RUBBER IMPORTS GROW

Washington, D. C., Aug. 30—Crude rubber shipments from the principal South American ports have shown an increase of 2,143,076 pounds for the year ending June, 1915, over the year previous, most of which surplus was imported by the United States, according to the report of George H. Pickrell, consul for the United States at Para, Brazil, to the department of commerce.

The total rubber shipped from the three chief rubber ports of the Amazon valley was 5,192,260 for the year ending June, 1915, as against 3,049,184 for the year

previous. Of this total, the United States took 3,088,114 and Europe, 2,104,147. The year previous the United States took 1,035,396 and Europe, 2,013,788; so that while the United States has increased its imports nearly threefold, Europe has stood practically stationary.

The three ports included in these figures are Para, Manaos and Itacaotira. Para shipped more than two and one-half times more to the United States than to Europe, Manaos shipped the greater part of its output to Europe and Itacaotira shipped all of its rubber to Europe. Para ships carry nearly three times the amount of rubber that the other two combined do.

### PUBLIC GARAGE TAX PENDING

Denver, Colo., Aug. 28—Two special tax ordinances, affecting the motor car business in Denver, have been introduced in the city council this week, and both are expected to pass when they come up for final action at the next meeting of the council. One provides for a \$25 yearly license fee for all public garages, and the other requires an annual license fee of \$25 additional for each curb pump for gasoline or oil.

These are a part of a series of special taxes being levied by the city this year to help make up the \$300,000 loss in revenue from saloon licenses when the state-wide prohibition law goes into effect January 1. A \$200 yearly license for filling stations was imposed by an ordinance passed about 2 months ago. Garagemen expect the curb pump permits to give them a better chance to compete with the regular filling stations.

### WISCONSIN TOUR A SUCCESS

Milwaukee, Wis., Aug. 28—Approximately 20 per cent of the 2,850,000 population of Wisconsin were placed directly in touch with the 1916 models of the leading motor car manufacturers of America by the booster tour undertaken by the Milwaukee Automobile Dealers, Inc..

The tour which advertised the show and the state fair, to be held September 13 to 17, started from Milwaukee August 23. The first day the tourists covered 109 miles, from Milwaukee to Janesville, Wis.; the second day, 153 miles were covered. Wednesday the route measured only 101 miles, being from Madison to Oshkosh. The fourth day took the tour from Oshkosh to Green Bay, 114 miles, by way of the Fox River valley, while on Friday, 131 miles were covered in the run home from Green Bay along the west shore of Lake Michigan. The schedule was maintained excepting in a few instances.

The tour was an acquaintanceship affair, for the purpose of getting everybody interested. Nevertheless, state agents report that their expense was justified many times over by the actual business done at this psychological moment.

## Battery Rental on Trial

### Electric Garages in Chicago to Lease Storage Units

### One Manufacturer Supplies Cars Minus Accumulators

CHICAGO, Sept. 1—Selling electric passenger cars in the city of Chicago minus the battery, so that the buyer can rent a battery at \$20 per month for the first year and \$16 per month for succeeding years is a new movement which is meeting with approval by many of the electric garage operators. The latter feel that the life of the battery in the electric passenger car is practically in the hands of the garageman and that he is the proper and logical party to handle the rental of such batteries.

These garagemen cite that at present electric car makers are increasing the guarantee on the battery life, yet neither these makers nor their dealers are in such constant touch with the owners as are the garagemen. The garagemen hope, under a battery-rental policy, to make considerably more out of the electric business. They say that up to the present the garageman rarely gets a chance to sell a new battery, this being handled by the manufacturer.

Under the proposed battery-rental system in Chicago, the Chicago electric is being sold for next year with or without a battery, according to the buyer's wishes. In case it is sold without battery, the buyer, it is expected, can rent a battery from several garages, entering into a contract with the garage to meet certain requirements so far as mileage is concerned, in order that the owner shall be protected in the battery given him, and further that he may be protected in getting battery renewals should the capacity drop below 80 per cent of the efficiency guaranteed for it under normal conditions.

This battery-renting policy so far has only been adopted by the Walker concern, which builds the Chicago car. The policy is purely an experimental one, and must not be confused with other exchange battery policies in which an owner can have a battery taken out and a new one inserted, instead of having to wait while one is recharged.

### No Gotham Call for Batteryless Electrics

New York, Sept. 1—Electric passenger vehicle dealers in this city say there is no demand here for electrics without batteries, owing to the large number of available service stations and no battery-renting system available. They state that there is growing demand throughout New England and the Middle West for cars without batteries at reduced prices.

RENO, Nev., Aug. 30—They claim out here on the edge of the so-called desert that transcontinental motor travel is beginning to ease off and that from now on very few westbound cars will be seen. What they say does not seem to be based on facts for the travel across the state has not decreased one iota. If a lessening of the traffic is noticeable at all it is in the eastbound tourists, who came out this way several weeks ago and are returning over the Santa Fe trail or the southern route.

Reno waited breathlessly for 2 days for Harry Kendall Thaw to pass through and then was disappointed last week, for if he did pass through Reno he did it in a hurry. He was recognized in Eureka and in Fallon, and Reno waited to have a glimpse of the man who has held position on the front pages of the papers for 9 years, but he did not come. It is thought he must have cut north and taken the road through the Feather river canyon.

The hundreds of machines that have passed through Nevada this summer is responsible for a recent movement for the improvement of roads in every section of the state. The merchants who were patronized by the tourists have learned that the people traveling by motor car use the route that is reputed to make for the most ease in travel. Now there is a demand in the office of every county commission in the state that more attention be paid to improving the main highways. It is realized that good roads are a big attraction to the motorist and from present indications Nevada will have some excellent highways to offer the tourist next summer.

#### Tourist Given Wrong Directions

Last week one motorist called at the commercial club for information about the roads between here and Lake Tahoe, and he told the secretary he had traveled 2,100 miles between Salt Lake City and Reno. He traversed a distance actually four times greater than he should had he been properly directed. When Secretary Buck heard the story he immediately wrote an article for the papers of the state in which he strongly urged that no one give road information except those who really knew. His article also suggested a re-marking of the main roads.

Practically to reconstruct the present Overland trail leading across Nevada so as to utilize almost all of the abandoned railroad grade of the Southern Pacific company in certain parts of the state is a plan that is being quietly discussed. For many miles the trail now follows the abandoned railroad grade and a great deal of work would not be necessary to make a first-class road out of it. It is understood that the permission of the railroad could be secured. The most expensive part of the work would be in constructing some new bridges where they have been removed, but the old piers and abutments still remain and this would not be very costly. From the quiet movement may come a

## No Motor Trek Wane

### Travel Through Reno Gate Disproves Prediction

### Plans Made to Reconstruct Overland Trail Across Nevada

real highway across the state that will be a real competitor of the Lincoln highway, particularly as the towns on the Overland trail are the oldest, richest and most populated in the state.

Travel during the last week has been just as heavy as it was during the early summer. Among the many parties going to and from the California expositions, together with their home towns, only one name being given in each party which averages from three to six, were:

M. Kranz.....	Great Falls, Mont.
Frank Scott.....	Chicago
J. H. Hayes.....	Lansing, Mich.
Charles A. Fenn.....	Salem, Ia.
J. J. Woodmaysee.....	Bemidji, Minn.
J. W. Ridenour.....	Kansas City, Mo.
Carl M. Ibold.....	Cincinnati, O.
D. G. Wilson.....	Mountain Grove, Mo.
C. H. Jaekle.....	Webster, Kan.
Henry L. Kuns.....	Mattoon, Ill.
Dr. J. D. Simmonds.....	St. Louis, Mo.
Robert Crane.....	Philadelphia, Pa.
H. P. Morse.....	Kansas City, Mo.
F. O. Bigelow.....	New York
T. C. Bassett.....	Storm Lake, Ia.
Dr. A. L. Dorst.....	North Platte, Neb.
G. Swickard.....	Council Bluffs, Ia.
J. B. Christenson.....	Marshall, Minn.
A. E. Callahan.....	Salt Lake City, Utah
C. H. Wright.....	Akron, O.
E. A. Goodnight.....	Panama, Okla.
Dr. J. B. King.....	Galion, O.
Clifford Patterson.....	Lamar, Colo.
F. J. Howard.....	Boston, Mass.

#### GARAGE IN THE DESERT

Blythe, Cal., Aug. 27—The first garage to be built on the 140-mile stretch of desert road between Mecca, Cal., and Vicksburg, Ariz., on the old Ehrenberg trail, has been erected here. In addition to a repair shop, the proprietors—Walsh & Bennett—intend to have a large stock of accessories in by fall.

#### PROTEST LINCOLN HIGHWAY TOLL

York, Pa., Aug. 30—An active campaign has been started by the citizens of York, Columbia and Lancaster counties, Pennsylvania, to do away with the toll charges now in effect on that part of the Lincoln highway crossing their respective borders. Pennsylvania is the only state that charges the Lincoln highway tourist anything for the use of the highway, but this is due to the fact that the toll roads are of long standing and not to the liking of the people of today. It is now a question of ways and means in disposing of the tolls system, and the sooner it is done the better for the people along this section of the highway.

A free highway league has been organized and it is doing its best to get the matter before the proper authorities, stir up interest and get action. A petition is to be laid before the public utilities commission, the state highway commissioner will aid, and Governor Brumbaugh will be

asked to lend his support. Pennsylvania has appropriated \$250,000 for the abolishment of toll roads, and persons along the Lincoln highway in this state feel it should be the first to receive attention.

#### A WARNING TO TOURISTS

Stamford, Tex.—Editor Motor Age—Being a subscriber to your magazine and also driving an A. A. A. car I would like very much to have you publish these facts.

First, the Woolfin's Garage at Amarillo, Tex., will not show any courtesy to the motoring public unless they are more than paid for services rendered. We bought a V-shaped fan belt, ran it to Texline and leaving Texline it broke in 5 places. They would not make any allowances whatever, also telling us that we could not have any welding done there, but they would have to order what we wanted. The Fourth Street Garage did our work in 4 hours.

Second, that people touring through western Texas, should, upon reaching Hamlin, Tex., have \$12.50, for they maintain in a lumberyard office, a court composed of a mayor and a deputy sheriff, for all visitors. We paid the \$12.50 for speeding. Our car having a broken steering arm at the time, the deputy's figures, also stop watch, showing we made seven blocks in 7 seconds, with a broken steering arm. For the benefit of the traveling public I warn them—go around Hamlin, Tex.—George D. Richards.

#### GOVERNMENT OPENS YOSEMITE ROAD

Washington, D. C., Aug. 28—Under the administration of Secretary Lane, the department of the interior has increased the pleasure of motor touring in this country by rebuilding the Tioga road which gives a direct entrance to Yosemite park from the east.

The Yosemite National park, east of San Francisco and near the Nevada state line has been open to motor tourists for some time, but motor cars from the east have, heretofore, been obliged to make a wide detour well into California and then double back to the park.

Appreciating the needs of an entrance route direct from the east, Stephen T. Mather, assistant to the secretary of the interior, early this year began work that has brought the old Tioga road, a mining road of the eighties into use, thus giving a direct entrance from the east that saves a long, roundabout trip.

Assistant Secretary Mather has issued instructions cautioning those using the Tioga road to take an ample supply of gasoline before making the trip from either side of the Sierras as gasoline cannot be supplied along the road at present.

#### CLUB'S TRAVEL FIGURES INTERESTING

Los Angeles, Cal., Aug. 28—It is estimated by experts of the touring department of the Automobile Club of Southern California that more motorists have entered California over the Lincoln high-

way, National Old Trails and Ocean-to-Ocean highways since January 1 than since the first transcontinental trip was made up to that date.

While thousands of "See America First" parties have motored into the Golden state during the last few months, the supply is far from being exhausted. The number of arrivals constantly is increasing and it is claimed that the season has just started.

There were thirty-one applications for touring information at the Automobile Club of Southern California headquarters yesterday by eastern motoring parties. In each of these parties there were, on the average, four persons. Special tours are being arranged by eastern motor clubs to bring added numbers to California and September and October are expected to break all records for motor travel.

With approximately 4,800 tourists arriving each month, 50,000 motorists will be entertained here in 1915, according to club reports.

It is estimated that 100 Ford machines from outside California passed through Los Angeles last week. In some of the parties there were as many as six persons.

Many heavy cars have arrived during the last few days, but the owners of the heavy machines are not so enthusiastic generally as those who arrive in lighter machines.

## Water 5 Cents a Quart

### Two Tourists Charged Fancy Price Near Fallon, Nev.

### Great Depth Necessary to Get Aqua Pura Reason for Demand

PORTLAND, Ore., Aug. 27—Having to pay 20 cents a gallon for water to cool the radiator of their machine was the experience of Randolph Holland and Arnold Larson, two youths who have just arrived in Portland after completing a 3,500-mile drive in their Ford from their home in Newark, Ill.

This experience happened in Nevada, near Fallon, when their machine played out near a ranch, where water is pumped from unknown depths by a gasoline engine. They needed one gallon and paid 20 cents for it.

The trip across the country was one of good luck. They arrived in Portland with Illinois air in one of their tires and only had one blowout and one puncture.

Leaving San Francisco they came to Portland by way of the coast route and reported the roads in excellent condition

north of the California line, but south of there they found them the worst of the entire trip.

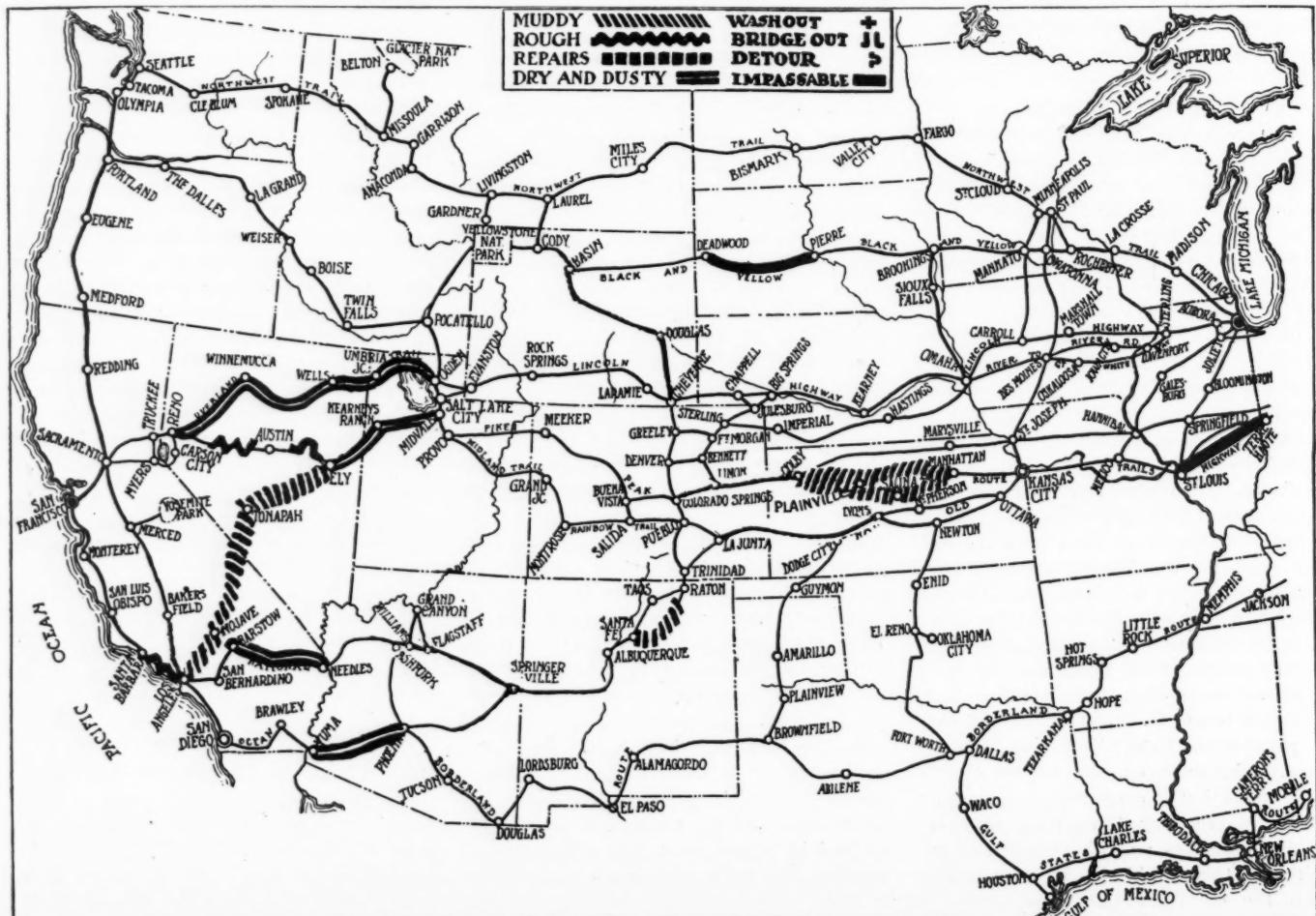
### PLAN TRANS-MICHIGAN ROAD

Lansing, Mich., Aug. 28—The Wolverine Highway Association, which is backing a project for the building of a trans-state highway from Grand Haven to Detroit known as the Wolverine Pavedway, met today and elected directors. Among these are Henry Ford, Henry P. Joy, Roy F. Chapin and R. E. Olds.

### 3,010 MOTORISTS VISIT PARK

MAMMOTH HOT SPRINGS, Yellowstone Park, Aug. 31—Special telegram—During August, the first month in which Yellowstone park has been opened to motor car tourists, a total of 825 motor cars have toured the park. These cars have carried a total of 3,010 tourists, an average of over three persons per car. Owing to the bad weather, tourist travel in the park has been falling off quite rapidly, the heavy rains throughout the territory west of the Mississippi being largely responsible for this decline in travel. —Col. L. M. Brett, Superintendent, Yellowstone National Park.

### Motor Age's Road Condition Map—Changed Weekly



# Straight Tips on Transcontinental Trails

*Latest Reports on Road Conditions from Those Who Know*



## TELEGRAPHIC TIPS

**IDAHO FALLS, IDA.**, Aug. 31—Special telegram—Road from Ogden to Logan and Preston is good macadam or gravel. Tourists should take Logan valley road in preference to the old route via Malad. Preston to Dayton and Pocatello is mostly good natural dirt or gravel road. The new state highway is very soft now, but will be in fine condition for next year. Pocatello to Blackfoot, Idaho Falls and St. Anthony is good graded dirt or gravel. Tourists should be cautioned to use the road via Ashton. From Ashton to Yellowstone park through pine forest all the way. Fair-to-poor natural road. Fine fishing and hunting along this route. Livingston to Gardiner fairly good; also Bozeman to Gardiner. Very scenic route with excellent hunting and fishing from Bozeman to the Yellowstone, down West Gallatin canyon road. Conditions are fair with some poor stretches. Trip by motor through Yellowstone park is well worth the tourist's time. Mostly excellent roads. Restrictions need not cause alarm. Schedules are just right to stop and see sights. The government officials are courteous and there are excellent accommodations in the park.—R. A. Woodall, Automobile Blue Book Road Scout.



**CODY, WYO.**, Aug. 31—Special telegram—Motor tourists to Yellowstone park report roads to Cody from the Lincoln highway at Cheyenne and from the Yellowstone trail at Billings in excellent condition. Just returned from a tour of Yellowstone park and

found roads excellent. Colonel Brett, superintendent of park, and assistants are doing everything to make it pleasant for tourists. Rules and schedules in the park are very liberal. About seventy-five cars went through Cody last week to the park.—J. M. Schwoob.



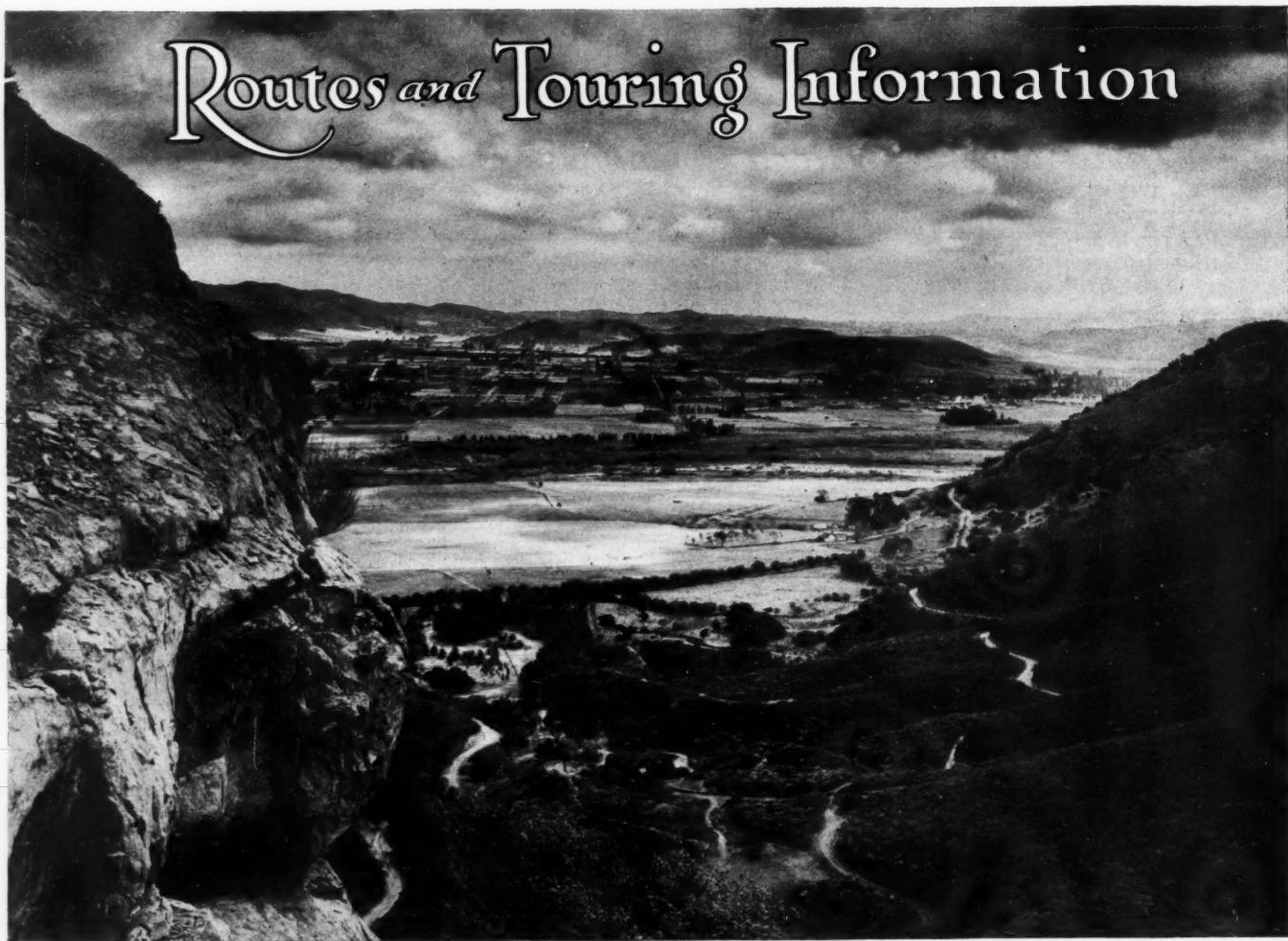
**RENO, NEV.**, Aug. 31—Special telegram—The Overland trail is becoming more and more dusty and more and more full of chuck-holes, according to motorists arriving here, who used that route traveling west. Lack of rain is the reason for it. The Lincoln highway also is dusty and bad in spots, but is decidedly the choice of the two routes at the present time. Both roads leading west from Reno are in good condition. They too are becoming dusty but not badly so. On Lincoln highway there is a bad stretch east of Fallon and some short stretches between Ely and Austin. The majority of the complaints are relative to the roads east of Ely. The total percentage of bad roads in Nevada still is small.—Spellier-Reinhart News Service.



**LOS ANGELES, CAL.**, Aug. 31—Special telegram—All routes to Los Angeles are suffering for want of rain, especially the Ocean-to-Ocean highway from Phoenix to Yuma. National Old Trails route between Seligman and Barstow, and the Lincoln cut-off, are dusty and sandy in places, but still popular. Seven hundred motors from outside this state are in Los Angeles county today, it is claimed. Motorists continue to come west.—Al. G. Waddell.

<b>OGDEN, UTAH</b> .....	Aug. 30—The Overland trail from Ogden to Reno is very dry, dusty and rutted. There has been no rain for nearly 3 months and as a consequence roads are anything but favorable. This applies to the Overland trail as well as the Lincoln highway. However, a good many people are traveling, and while some are complaining others are tolerant enough to realize that the people of these states are not to blame for the long dry spell which alone accounts for such bad road conditions. The road from Ogden to Yellowstone park is good, with the exception of places where road building is in progress. Detours, however, may be made to eliminate hard running at these points.—J. David Larson, Secretary, Ogden Publicity Bureau.
<b>ST. LOUIS, MO</b> ..... [National Old Trails]	Aug. 31—From St. Louis to Kansas City tourists crossing Missouri westward should leave the National Old Trails road at High Hill, running north to Mexico, then going to Columbia and following the National Old Trails road from that point through Boonville and Marshall into Kansas City. Roads are good in dry weather. From St. Louis to Springfield, Ill., road conditions are good. From St. Louis to Terre Haute, according to latest reports, road is impassable. Persons making this trip are advised to take the Big Four route. From St. Louis to Keokuk roads are fair.—Matthew F. Morse, Secretary, Automobile Club of St. Louis.
<b>OMAHA, NEB.</b> ..... [Lincoln Highway and Omaha-Lincoln-Denver Route]	Aug. 30—The Lincoln highway west is in fairly good condition. Omaha to Kearney generally good. West Grand Island good and bad in spots. The Omaha-Lincoln-Denver to Hastings is good. West of there it is good and bad in spots. From Omaha to Kansas City road is fair from Falls City to Kansas City. Omaha to Iowa Falls generally good. The Lincoln highway east is good. White pole and River-to-river routes both good.—S. E. Smyth, Assistant Secretary, Omaha Automobile Club.
<b>KANSAS CITY, MO</b> ..... [Golden Belt Route]	Aug. 31—The Golden Belt road is under water and is consequently impassable.—Kansas City Automobile Club.
<b>ST. PAUL, MINN.</b> ..... [Red Trail, Black and Yellow Trail]	Aug. 31—The Red trail from St. Paul to La Crosse is in fairly good shape. The bridge at Red Wing again is in good condition. St. Paul to Fargo, very good to Alexandria; between Alexandria and Fargo, bad, due to recent heavy rains and work on the road. St. Paul to Sioux Falls over the Black and Yellow trail, very good in dry weather. St. Paul to Mason City, over the Inter-State trail, good.—T. M. Johnson, Secretary, Automobile Club of St. Paul.
<b>RATON, N. M.</b> ..... [Ocean-to-Ocean Highway]	Aug. 31—Roads in very fair condition from Trinidad to Raton, some mud south. From Las Vegas to Santa Fe good, and fast road between Santa Fe to Albuquerque. Road from Socorro to Magdalena and west to Quemado in good condition. Light showers, but no heavy rains to delay travel. Weather conditions favorable.—J. S. Mactavish, President, Ocean-to-Ocean Highway Association.
<b>LOS ANGELES, CAL.</b> ..... [Coast Route]	Aug. 28—Generally fair roads on Coast route, although there are some sections where slow traveling is necessary. All cars traveling north should detour from the state highway north of Santa Barbara via San Marcos pass to Los Olivos. This pass itself is in fair condition, but from the east foot of the grade into Los Olivos, a distance of some 17 miles, very rough road will be encountered, which calls for a speed limit of not to exceed 12 miles per hour. From Los Olivos to Los Alamos, good dirt road; from Los Alamos to Harris, paved road; Harris to Orcutt, dirt, and Orcutt to Santa Maria, paved. North of Santa Maria the first 3 miles is slow going, over sandy roads, but it recently has been strawed. After passing this road generally good road will be found into San Francisco.—Automobile Club of Southern California.
<b>BILLINGS, MONT.</b> ..... [Yellowstone Trail]	Aug. 30—Montana now is in the midst of its dry season. There has been no rain of consequence within the last month. Roads through all surrounding territory are in fine condition.—Roscoe C. Wright.

# Routes and Touring Information



TRAPICO AS SEEN FROM GRIFFITH PARK, NEAR LOS ANGELES, CAL. NOTE WINDING ROAD

## California's Claim for Wonder Trails Seems Well Substantiated—Beauties of El Camino Real

LOS ANGELES, Cal., Aug. 28—Many of the eastern motorists come direct to Los Angeles over the National Old Trails route and others enter California through the Imperial valley to San Diego, returning over the National Old Trails route to their eastern homes. Entering by either of these routes and returning over the other, the visiting motorist may see all the wonders of El Camino Real, the Yosemite and the two great international expositions in a short time by going up either the Inland or Coast route to San Francisco and back down over the other highway.

### Los Angeles-San Bernardino Boulevard

For the transcontinental motorist entering the state at Needles, driving through Cajon pass to San Bernardino, and then into Los Angeles, the roads now are in very good condition with the exception of 133 miles between Needles and Barstow where the sand is several inches deep in many stretches, notwithstanding the fact that the supervisors of San Bernardino county have been working on this desert highway. From San Bernardino to Los Angeles, the boulevard is completed the entire distance.

Road conditions throughout California

By Al G. Waddell

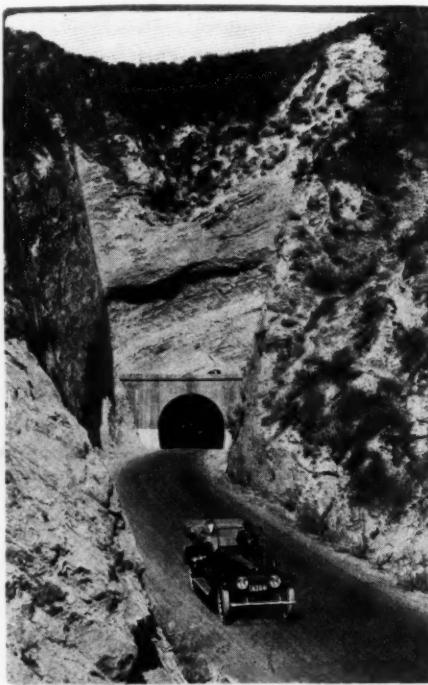
are rapidly improving. The counties have exerted strenuous efforts in road work and visiting motorists will find California's highways in excellent condition.

From Los Angeles to San Francisco, leave Los Angeles via San Fernando valley, the original El Camino Real. Take Bouquet canyon road to Elizabeth Lake, thence to Willow Springs. Fourteen miles are saved by taking the Oak Creek cut-off from Willow Springs. This cut-off is sandy in places but should not hinder the progress of the average car. Tehachapi pass is in very fair condition and no trouble will be encountered between that point and Bakersfield. The new state highway is completed for a distance of 34 miles north of Bakersfield.

### Dirt Road Detour

North of Delano it is advisable to take the old dirt road, running parallel to the railroad, coming back onto the main road at Tipton. From there to Tulare and Goshen, thence to Kingsburg, fair dirt road will be found practically the entire distance. From Kingsburg through Fresno to Madera, the state highway is complete.

Road conditions from Madera to Wawona via Grub Gulch are greatly improved. It is approximately 110 miles from Ma-



MODERN ENGINEERING SOLVES PROBLEM

dera to Wawona and there are 16 per cent maximum grades on the route.

Those wishing to enter the Yosemite through Wawona should leave in the morning between 6 and 8 o'clock. Motorists also should leave Yosemite between 6 and 8 o'clock for Wawona and the Big Trees. The roads from Yosemite to Stockton by way of Crane Flats and Sequoia and thence through Big Oaks to Knight's Ferry is by far the best route as it has fewer steep grades than either of the other two. It is possible to make the run from Madera to Wawona taking in the Big Trees, in 1 day, leaving the next morning for Yosemite. It is 28 miles from Yosemite to Stockton.

From Tracy, either the Patterson pass or Altamont pass can be taken. From Livermore into Oakland there is a very fair dirt road. The state highway is completed from San Francisco to Santa Clara and on the trip south from there to San Jose the road is chucky. The highway is complete from San Jose to Sargeant and from Sargeant through Salinas, Gonzales and Greenfields to King City there is a very good dirt road. It is necessary to ford the Salinas river just before reaching San Maguil, but there is a man at the river with horses to tow motorists out of the sand. From there to San Luis Obispo part of the road is paved state highway and the rest is excellent dirt road.

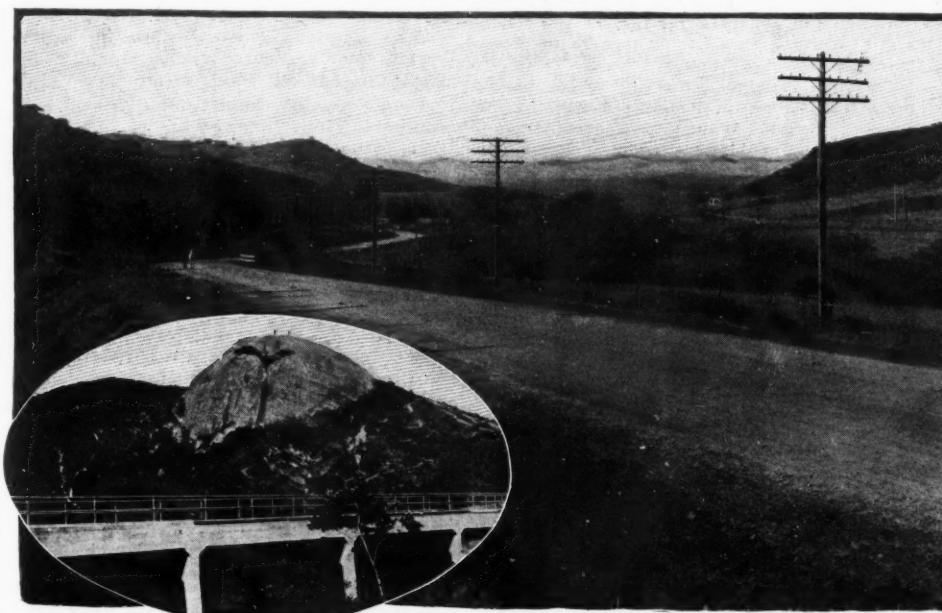
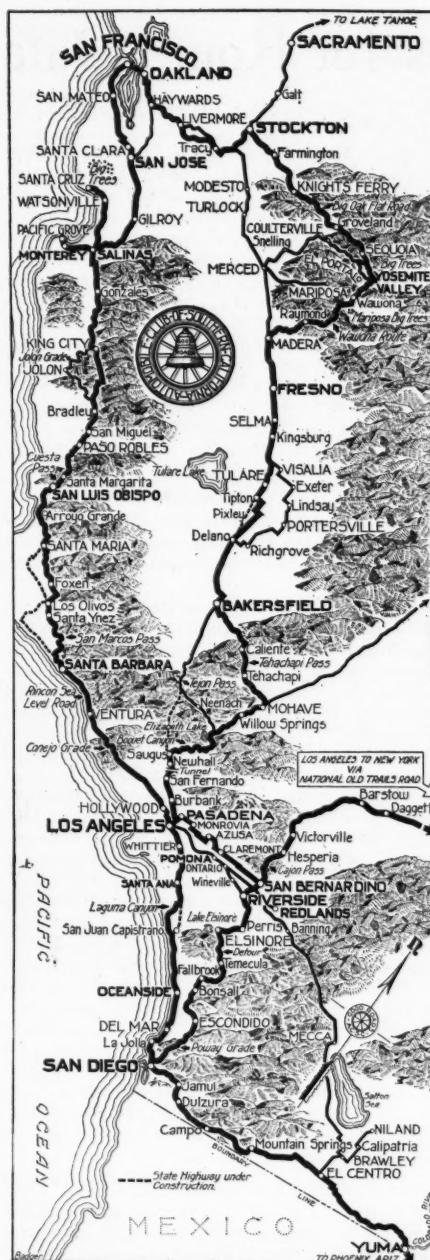
From San Luis Obispo through Pismo Beach and Oceano to Nipomo, the road is good. From Los Olivas to the northern side of the San Marcos pass the going is rough and should be taken slowly. The southern slope is in excellent shape.

The Rincon sea level road now is open from Santa Barbara to Ventura, although many motorists prefer to drive over the Casitas pass, the original El Camino Real route. From Ventura south, dirt roads will be encountered for 14 miles and then

paved roads to the bridge at the foot of the Canejo grade. Dirt road then will be found to the top of the grade and paved road on to Los Angeles.

Leaving Los Angeles via East Seventh street, continue out past Whittier over the La Habra hills to Fullerton, passing through Anaheim and Santa Ana. The state highway is broken by 2 miles of dirt road south of Santa Ana at the end of which the state highway begins again, running to Laguna Beach. There also is a good dirt road down the old El Camino Real route to San Juan Capistrano Mission. From Laguna to the foot of the Torrey Pine Grade, most of the road is paved. From there into San Diego over the grade or through the Rose Canyon, there is a fair dirt road of well-rolled gravel.

From San Diego out over the Ocean-to-Ocean highway through the Imperial valley the roads are somewhat dusty, but in fair condition, and the plank road may be used on the way to Yuma and Phoenix, avoiding the Mammoth Wash. The new bridge over the Colorado at Yuma is the gate in and out of California via the Ocean-to-Ocean highway and the Borderland route.



OVAL—EAGLE ROCK NEAR LOS ANGELES—COUNTRY BOULEVARD IN CALIFORNIA—UPPER RIGHT, MOUNTAIN GRADE A FEW HOURS OUT OF LOS ANGELES

## Answers to Inquiries for Route Data

**C**HICAGO—Editor Motor Age—Kindly give best route from Chicago to Lanark, Ill.—J. C.

From Chicago, drive through Maywood, Itasca, Elgin, Genoa, Cherry Valley, 87 miles over good gravel roads, to Rockford, Ill. Then route west 27 miles to Freeport, and 25 miles to Lanark. Fair to good dirt roads in dry weather over rolling country most of the way.

### Albert Lea, Minn.-Mount Horeb, Wis.

Albert Lea, Minn.—Editor Motor Age—Kindly furnish me with information as to the best route to be followed in traveling from Albert Lea, Minn., to Mount Horeb, Wis.—Oscar C. Olson.

From Albert Lea to Mason City, via Glenville, Minn., Northwood, Ia., Kensett, and Manly—this is over a fairly good dirt road. From Mason City to Prairie du Chien, via Nora Springs, Rudd, Floyd, Charles City, New Hampton, Hawkeye, West Union, Postville, Monona, McGregor, Ia., and across the Mississippi Ferry. This is a section of the North Iowa Pike, and is over natural dirt roads, fairly well dragged. It is advisable to arrange in advance for the ferry across the Mississippi, as the barge that carries the car does not make each trip. From Prairie du Chien to Mt. Horeb via Bridgeport, Mt. Hope, Fennimore, Montfort, Dodgeville, Ridgeway, and Blue Mounds to Mt. Horeb. This stretch from Prairie du Chien to Mt. Horeb is over natural dirt road, with considerable clay, and therefore is not recommended in wet weather.

Complete running directions will be found in volumes 5 and 4 of the Blue Book, Automobile Blue Book Publishing Co., 910 South Michigan avenue, Chicago. Price \$2.50 per volume.

### Monett, Mo.-Effingham, Ill.

Monett, Mo.—Editor Motor Age—What is the best route from Monett, Mo., to Effingham, Ill.?—C. A. Maher.

As there is no practicable route through the Ozark country of southern Missouri, we consider it best to drive northwest to Carthage, there picking up an established route and following same through Lamar, Nevada, Butler and Belton to Kansas City, then east through Marshall and Columbia to St. Louis. Follow the old National road from St. Louis through Vandalia to Effingham. Volume 5 of the Blue Book will give complete running directions to St. Louis from Carthage, Mo., and volume 4 from St. Louis to Vandalia. They can be had from the Automobile Blue Book Publishing Co., 910 South Michigan avenue, Chicago, at \$2.50 per volume.

### Chicago-Kalamazoo, Mich.

Chicago—Editor Motor Age—Kindly give the best route from Chicago to Kalamazoo, Mich., stating mileage and condition of roads.—M. C.

Leaving Chicago route 67 miles to Michigan City, passing through Hobart, Ind., Porter, Michigan City, over macadam or gravel roads. Then 40 miles via the Shore Line over improved stone and gravel, via New Buffalo, Mich., Harbert, Bridgeman Station, Stevensville, to St. Joseph, Mich., and 52 miles over good gravel and macadam, through Benton Harbor, Riverside, Coloma, Watervliet, Hartford, Lawrence, Paw Paw, to Kalamazoo.

### Mendota, Ill.-Mauston, Wis.

Van Orin, Ill.—Editor Motor Age—Kindly give me the best route from Mendota, Ill., to Mauston, Wis., together with mileage. Kindly give the hard roads, and if there are any short cuts on dirt roads in good weather, mention same. Would the roads

be in good condition in September?—F. W. Grisell.

From Mendota go north 30 miles to Rochelle, and 25 miles to Rockford. Drive next 79 miles through Beloit, Janesville, Edgerton, Stoughton and McFarland to Madison; a gravel and macadam road paralleling the Rock river to Janesville. Now go 42 miles via Sauk City and Prairie du Sac to Baraboo; here turn north and motor 13 miles over fine macadam to Kilbourn, then to Mauston which is but a short distance northwest of Kilbourn.

This is the most direct route between the points mentioned and over good roads almost the entire distance. Volume 4 of the Blue Book contains running direction from Mendota to Kilbourn.

### Asheville, N. C.-New Orleans, La.

Asheville, N. C.—Editor Motor Age—Kindly give me the best route from Asheville, N. C., to New Orleans, La.—P. R. Terry.

Drive south 59 miles to Greenville, N. C., then southeast to Atlanta, Ga., 188 miles, the intermediate points being Piedmont, Anderson, Fair Play, Canon, Pocataligo, Jefferson, Lawrenceville, Stone Mountain and Decatur. It is 188 miles through McCollum, Grantville, West Point, Glass, Opelika, Tuskegee and Mount Meigs to Montgomery. Go west 50 miles to Selma, Ala., thence to Thomasville, Ala., 77 miles through Hazen, Safford, Thomaston and Shiloh. Turn south and motor 107 miles through Leroy, McIntosh, Mt. Vernon and Saraland to Mobile.

Proceed west from Mobile through Orange Grove, Ocean Springs, Biloxi and Gulfport to Pass Christian, Miss., over a sand-clay road to Ocean Springs and fine shell road to Pass Christian. The last stretch of 126 miles to New Orleans is over sand-clay roads through pine forest, passing en route the towns of Vidalia, Poplarville, Balltown, Bogalusa, Vlaiborne and Milneburg. There is a cut-off from Poplarville to Bogalusa avoiding Balltown. Inquire at Poplarville regarding this road. Blue Book, volume 3, contains complete running directions.

### Nowata, Okla.-San Angelo, Tex.

Nowata, Okla.—Editor Motor Age—Kindly give me a routing from Nowata, Okla., to San Angelo, Tex., via Coffeyville, Kan., Arkansas City, Kan., and Oklahoma City. What is the general condition of the roads and about how long should it take to make this trip?—Roy E. Cobbs.

Go north through Coffeyville to Independence, then west over the Oil Belt route through Sedan, Wauneta, Cedarville and Dexter to Winfield. Here you pick up the Oklahoma, Texas and Gulf highway and proceed south on it 152 miles through Arkansas City, Newkirk, Ponca City, Perry and Guthrie to Oklahoma City.

Continue south on the Gulf highway through Noble, Wynnewood, Sulphur and Milburn to Denison, 194 miles, and via Howe and Melissa to Dallas. Turn west and drive 33 miles over good gravel to Fort Worth. Continue west 197 miles through Weatherford, Palo Pinto, Ranger, and Putnam to Abilene; then bear southwest 100 miles via Bradshaw and Ballinger to San Angelo. Blue Book, volume 5, contains running directions from Winfield to San Angelo. It should take you about one week to make this trip, averaging 100 miles per day.

### Raton, N. M.-Yale, Okla.

Sugarite, N. M.—Editor Motor Age—Kindly outline trip from Raton, N. M., to Yale, Okla., touching Belvidere, Kan., on going

trip, returning via Denver. Also advise approximate mileage.—A. L. Brockman.

From Raton drive 25 miles to Trinidad, and 85 miles to La Junta, Colo. Here you pick up the Santa Fe trail and proceed east on it 117 miles through Las Animas, Lamar, Granada, Syracuse, Deerfield and Garden City to Dodge City. At Dodge City make local inquiry as to road directions to Belvidere, Kan.

From Belvidere go east through Attica, Harper, Milan, Wellington, and Oxford to Winfield. Here turn south and drive 103 miles through Newkirk, Ponca City, Perry, and Orlando to Guthrie. At Guthrie make inquiry as to directions to Yale which is a short distance east of Guthrie.

### Contingent Tour Expenses

Topeka, Kan.—Editor Motor Age—Am expecting to tour to the Pacific coast, and return by the southern route. What is the probable cost per day for living expenses, and the probable cost per day for car expense? What mileage should I average per day? What is the latest date I should start to safely cross the mountains before bad weather.—Topeka.

Three dollars per day per person will probably cover all costs except tire expense; \$4.50 per day per person is a generous allowance. As to mileage per day: That depends upon one's own inclinations and time. Many want to travel across the country in a leisurely fashion, while there are others who seem possessed to make mileage at the expense of comfort and pleasure. From 100 to 150 miles per day is considered a good day's run. After October 1 one is likely to encounter snow in the mountains, which makes traveling through the canyons dangerous.

### New York-Ronceverte, W. Va.

Mamaroneck, N. Y.—Editor Motor Age—Kindly give me the best route from New York City to Ronceverte, W. Va.—L. F. Carrillo, Jr.

From New York City drive through Tren ton, N. J., to Philadelphia, 97 miles; then 101 miles through Chester, Wilmington, Newark, and Havre de Grace, to Baltimore. Leave Baltimore and go west 95 miles to Winchester, Va., the way points along Ell iott City, Frederick, Harper's Ferry and Charleston. Macadam road this entire distance.

Go south 92 miles through Strasburg, New Market, Harrisonburg and Burkertown to Staunton, over a fine pike. Drive west 62 miles to Hot Springs, Va., via Churchville and Fairview, over a dirt road with sandy stretches, macadam the first 10 and last 5 miles. Continue west 9 miles to Lewisburg, then go south to Ronceverte.

### Pocatello, Ida.-St. Paul, Minn.

Twin Falls, Id.—Editor Motor Age—Kindly outline a route from Pocatello, Id., to St. Paul, Minn. Would it probably be possible to return, as far as the snows are concerned, as late as November 15, or thereabouts?—Dr. W. F. Pike.

From Pocatello drive through Bear River City and Brigham to Ogden, 137 miles; then east through Evanston, Granger, Rock Springs, Wamsutter, Rawlins, Medicine Bow, Laramie, to Cheyenne, 476 miles. Continue east, heading for Omaha, Nebr., 537 miles, passing en route Kimball, Chappell, Ogallala, North Platte, Gothenburg, Kearney, Grand Island, Columbus, and Fremont.

From Omaha drive east through Missouri Valley, Denison, Carroll, Grand Junction and Boone to Nevada, 191 miles; here turn north picking up the Inter-State trail and following the blue and white bands through Iowa Falls, Mason City, Northwood, Albert Lea, Owatonna, Faribault, Northfield and Farmington to St. Paul.

October 15 is the latest you should motor in the mountains. After that time, and

oftentimes before then, one encounters snow in the canyons which makes mountain touring dangerous.

#### Yellowstone Rates Too High

Oklahoma City, Okla.—Editor Motor Age—The descriptive story of Yellowstone National park in a recent issue is very interesting and besides describing the beauties also should call public attention to the necessity for protecting their heritage; all parks that are public are supposed to belong to the public and be maintained by the public funds. This one should be no exception. All camping sites should be free to all comers, all hotel charges should correspond to rates in other localities, or be less, to accommodate those who desire to visit the park, but are limited in means. Some may say the 50-mile haul would advance the cost of provisions; possibly so, but this should be scarcely noticeable with motor trucks.

Now consider a quotation of \$3 a day for camping and \$5 a day for hotel fares. Would it be possible for a family of four or five with limited means to enter at all, either as hotel guests or campers.

I think the people should demand of the

interior department and its representatives that laws be made immediately to regulate all charges, bringing them to the lowest point, and all camping sites should be absolutely free to all comers. Gasoline for the tourist should be sold at the lowest figure.

I repeat, are not even the logs with which the Mammoth Hot Springs Hotel is constructed from the public land, and the soldiers who police the park in the public's pay, and the highways constructed with public money? Let all have the joys of the park on an equal basis.—E. R. Harrington.

#### Good Word for Yellowstone

Cody, Wyo.—Editor Motor Age—I have just finished a combination camping and hotel trip into Yellowstone park. Outside of some showers at times there is no question about a safe trip through the park. It is not absolutely necessary to carry a camp outfit, as there are many places to stop in the park, with prices ranging from \$3 to \$5 a day. Campers can get supplies at many points and gas and oil are to be had wherever needed. The regulations are not so bad as some think, and if motorists will give consideration to safety of horse-drawn

rigs there will be no trouble with the park management.

I made inquiries of cars coming in from the Lincoln highway and find that outside of now and then after a rain the road is as good as may be expected and good time can be made.

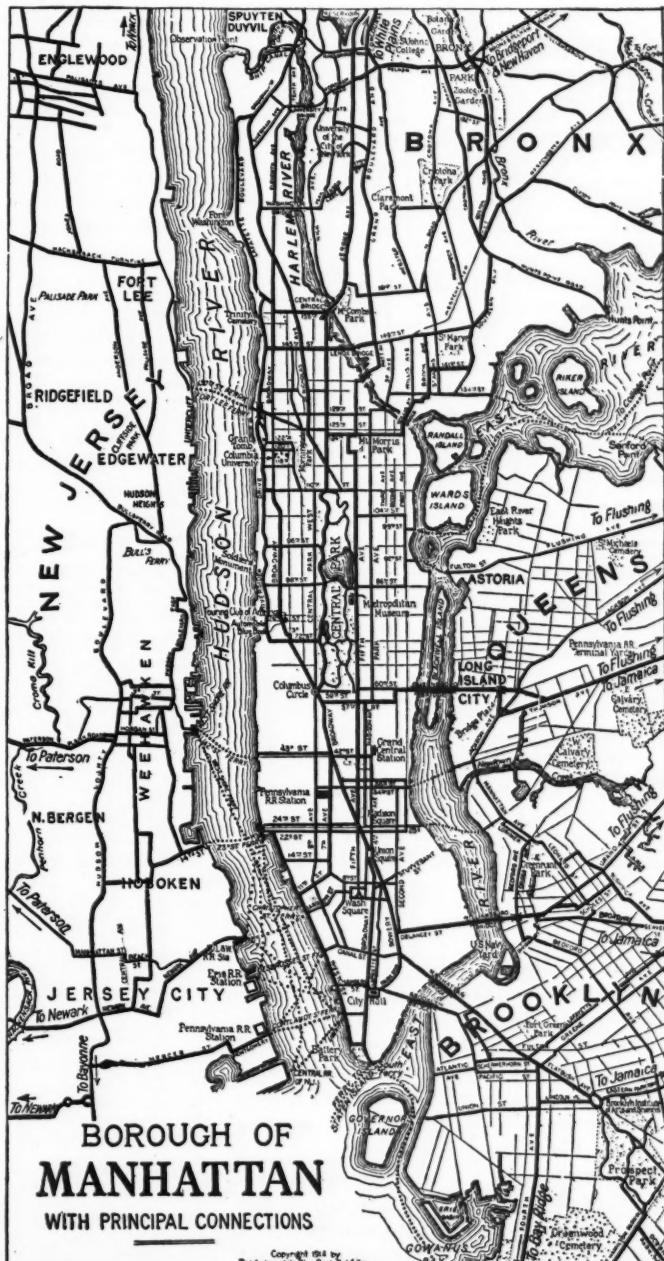
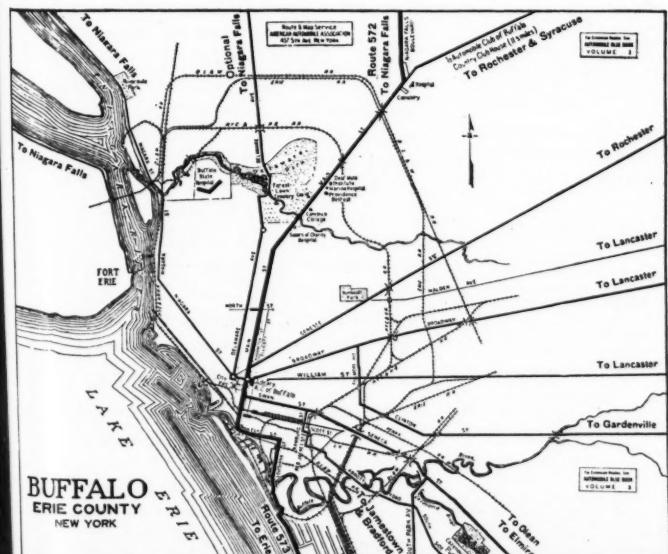
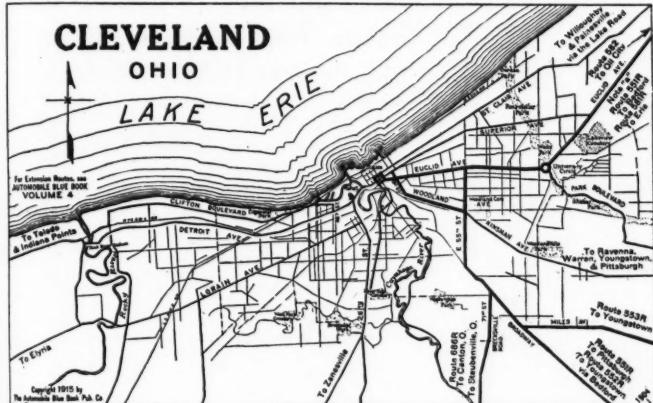
The Billings-Cody way is good at all times and well marked now. The Thermopolis-Lost Cabin cut-off should be ready by September, and then there is a new road opened, leaving Lost Cabin and going south through Lander to Rock Springs on the Lincoln highway, which gives an opening to Salt Lake City from Wyoming south and will save going so far east.

The Black and Yellow Trail while passable, is not to be recommended for this season. About \$15,000 is being spent on this trail over the Bighorn mountains and by another season it will be safe.

It has been stated that the 70 miles from Cody to the top of Sylvan pass is the most scenic 70 miles in the United States. We have had about 125 cars enter the park from this side and only two of them have had any trouble, which speak well for our roads.—Gus Holm, President, Cody Club.

## For the Guidance of Transcontinental Tourists

Believing that tourists often experience trouble passing through large cities, Motor Age herewith presents the sixth of a series of maps, all copyrighted by the Automobile Blue Book Publishing Co., showing the best routes through three of the larger cities on sections of transcontinental trails.





# The Readers' Clearing House

## MAGNETIC OPERATION OF VALVES?

System No Doubt Would Cost More Than Present One

DA CONO, Colo.—Editor Motor Age—The other day a discussion arose as to the possibility of operating the common poppet valves on a gas engine by means of electro-magnets. The idea was somewhat interesting and I desire to lay it before you for comment, as I do not know that I have ever seen the subject mentioned in your columns, or elsewhere.

At first glance the idea seems novel enough, even somewhat startling. But if certain conditions could be fulfilled my opinion is that such valve control would offer important advantages over the present fixed and mechanical drive. The elimination of the camshaft, its bearings, lubricating system, etc., would mean something. Offsetting this, of course, would be the necessary magnets for operating each valve, and the distributor for controlling and reversing the current to these magnets. What form such a distributor would take I do not know, but its design would probably be one of the lesser troubles in making this system. Granting for the sake of argument that such a method of valve actuation was possible, certain advantages would be obtained.

1—Valve action could be advanced or retarded according to the engine speed, thereby obtaining increased power and economy for the outer speed ranges.

2—The design of the gas engine proper would be simplified, due to the absence of the cam-shaft, valve tappets, etc.

3—The valve mechanism, instead of being an integral part of the engine, would tend to become in the nature of an accessory, like the magneto, or starter, with all its elements open to easy inspection.

4—Action absolutely quiet, with less wear, adjustments, oil leaks, etc.

5—Instantaneous opening and closing of the valves.

The questions of relative cost, weight, reliability, etc., can only be settled by designing the parts. Our impression is that they would compare favorably with the present system. Current consumption would not be a much greater factor than power used to drive valves mechanically. It may be that a larger battery and generator would be necessary.

The whole scheme, of course, may be impossible, due to inability to provide magnets small enough, and strong enough, to properly open and close the valves. By decreasing valve weight and head diameter, and increasing lift, this might be rendered more possible.—Colorado Reader.

While it may be possible to get an arrangement whereby the valves will be opened and closed magnetically, it appears that there will be as much, if not more complication than the present systems used and difficulties will come up in the way of preventing magnetisation of some of the parts.

A suggested method of controlling the valves magnetically is shown in Fig. 1. Here, solenoids are used for both opening and closing. The valve stem is made almost twice the size of the ordinary stem and at a midpoint a piece of soft iron is secured, the iron acting as the moving element for two solenoids one above the other, as shown. There will, of course, have to be bracketing to hold the solenoids firmly in place and also some form of protection against water, etc.

The top solenoid will pull the valve closed and the bottom one will push it open but in order to do this the current must be sent to the coils at stated intervals. A distributor, much the same as an ignition distributor, could be used for this. This will have to have eight contacts for a four-cylinder motor, sixteen for an eight

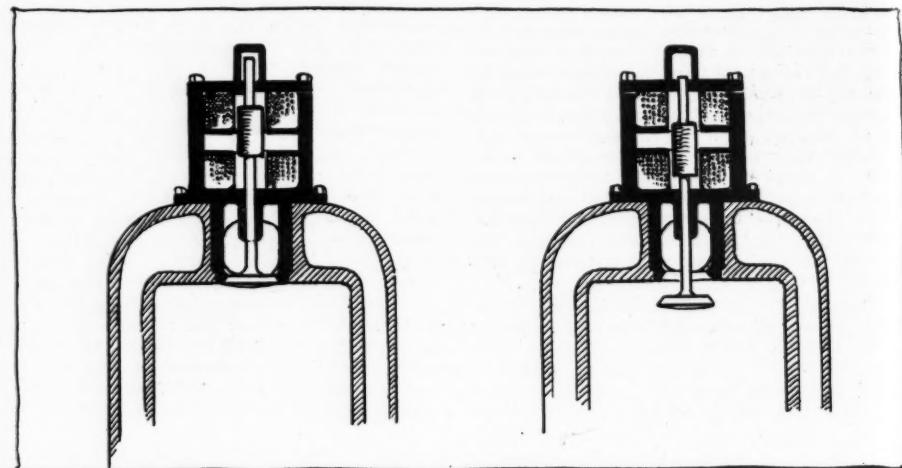


FIG. 1—METHOD SUGGESTED FOR OPERATING VALVES MAGNETICALLY

This shows two solenoids, one above the other and using a common moving member, for opening and closing the valves magnetically. A form of ignition distributor is used to send the current to the proper solenoid at the proper time

and twenty-four for a twelve. This distributor must be driven from the motor.

It appears that the cost of the coils, valves, distributor, distributor drive, extra wiring and battery will cost more than a regular camshaft with its push rods, etc. While it may be imagined that better opening and closing will be had with the magnetic control, lag in the system must not be forgotten, as this would certainly interfere with the timing of the valves. Also the valve stem metal must be such that it will not retain magnetism, for if it did it would cause partial sticking at the guide.

### A Bright Question—About Lamps

Barrett, Minn.—Editor Motor Age—When taking out a storage battery in a car to recharge it and it takes some time before it is replaced, could not some kind of system be connected to the positive and negative wire so that the lights could be used while running using the car just the same without the storage battery?—Sam Bjelland.

While it is possible to do this in some systems, it is not at all safe to try it, for you may blow a fuse or burn the armature windings. When you wish to have your battery charged from an outside

source, borrow a battery from a garage, or if you go to a regular service station, it will loan you one for about 10 cents per day.

### MOTOR MISFIRES AT MEDIUM SPEED

Probably Poor Carburetor Adjustment,

But May Be Valve Trouble

Memphis, Tenn.—Editor Motor Age—I have a C 55 Buick that misfires when running at any set speed below 20 miles an hour when going up a hill. The motor misfires on level ground like a car does when running down a hill with the wheels turning the motor over. No matter how bad it is missing, if you feed it more gas it will pick up. When car is standing idle the motor will hit on six-cylinders awhile with spark retarded, but will not hit on six-cylinders with spark advanced. I have had valves reground and adjusted, carbon cleaned out, Delco inspected, put new spark plugs on motor, tried a Stromberg carburetor on it and have adjusted the Marvel carburetor that is on it all kinds of ways, but the miss is still there. I am thinking of putting a Schebler carburetor on it. Do you think that it will stop the misfiring?—A Reader.

While Motor Age is of the opinion that the carburetor is at fault, it is suggested that instead of getting a new carburetor you have an experienced man adjust the Marvel. There is a lot in knowing how to do this work and an inexperienced man can throw the whole system out of adjustment. Also the valve tappets may be adjusted poorly. It is assumed that after the Delco system was examined it was pronounced fit for service. You may have installed a new set of spark plugs, but the gaps may be too wide or perhaps too narrow. Try about  $\frac{1}{32}$  inch for the gaps. See that there are no leaks around the valve cages and manifolding.

### RACES WON BY RALPH DE PALMA

Records Made and Now Held by Bob Burman Also Are Given

Los Angeles, Cal.—Editor Motor Age—What official records are held by Bob Burman and Eddie O'Donnell?

2—Name the first places won by de Palma during his career as a driver.—F. G. H.

1—The tabulation on the opposite page

### Questions Answered and Communications Received

Colorado Reader	Dacono, Colo.
A Reader	Osceola, Ark.
A Reader	Memphis, Tenn.
Sam Bjelland	Barrett, Minn.
F. G. H.	Los Angeles, Cal.
Wesley J. Bailey	Harlingen, Tex.
Subscriber	Bloomingburg, O.
Reader	Roswell, N. M.
D. B. Wheeler	Union City, Tenn.
F. C. Landay	Paincourtville, La.
J. J. Brookmire	Findley Lake, N. Y.
Geo. S. Wilcoxon	Gwynneville, Ind.
Victor West	Kellerton, Ia.
W. G. Hart	Carmichaels, Pa.
Anton Brady	Bayside, L. I.
R. E. S.	Trenton, N. J.
R. F. Hoffman	Hamilton, O.
George E. Berg	Yukon, Okla.

No communications not signed with the reader's full name and address will be answered.

are records established by Bob Burman since institution by Contest Board of the American Automobile Association of Register of Records. Those marked \* are still held by Burman.

O'Donnell holds no official records.

2—It would be almost next to impossible to obtain a complete record of de Palma's victories, Ralph himself stating that he cannot remember all the minor events he has won. His record, as far as we know, is as follows:

1907

Won 5-mile race from Barney Oldfield and Harry Grant at Boston.

Won 25 and 50-mile races at Elkwood Park, N. J.

Won 5, 10 and 25-mile races from Barney Oldfield at St. Paul, Minn.

1908

Defeated Walter Christy in match race at St. Paul.

Won three events at Brighton Beach and won 10-mile match race from George Robertson.

Won 5 and 25-mile races at Providence, R. I.

Won two 25-mile races at Readville, Pa.

1909

Won his first road race, 227.5-mile event for stock cars selling for \$4,001 and up at Riverhead, L. I.

1910

Leading on last lap of grand prize when cylinder blew out.

First in ten, second in three and third in four speedway races at Indianapolis, Atlanta and Los Angeles.

1912

Won four road races—first in Elgin trophy, Elgin free-for-all, Vanderbilt cup and Santa Monica light car event.

1913

Won C. A. C. cup race at Elgin.

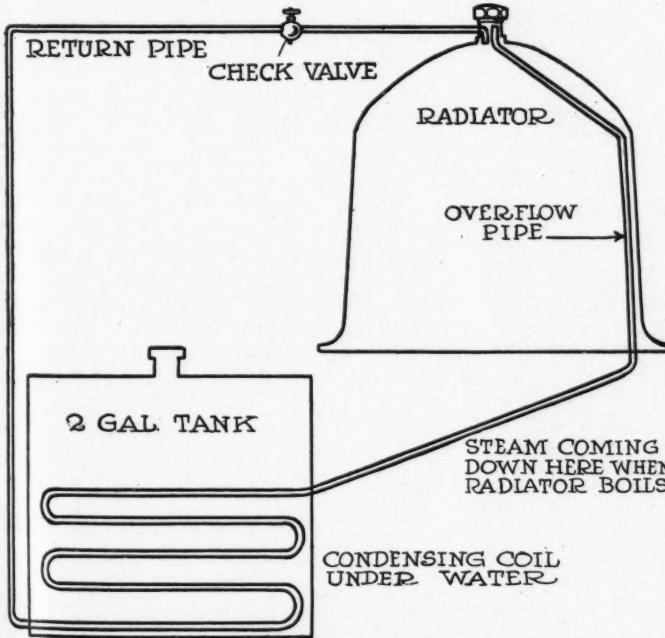


FIG. 2—FAULTY CONDENSER DESIGN

A New Mexico reader of Motor Age has suggested this, but there would be trouble because the operation depends upon steam pressure forcing cold water back to the radiator

## A. A. A. Records Established by Burman

STRAIGHTAWAY FREE-FOR-ALL RECORDS, REGARDLESS OF CLASS					
*1 kilo...	15.88...	Blitzen-Benz	Daytona, Fla.	April 23, 1911	
*1 mile...	25.40...	Blitzen-Benz	Daytona, Fla.	April 23, 1911	
*2 miles...	51.28...	Blitzen-Benz	Daytona, Fla.	April 23, 1911	
*20 "...	13:11.92...	Buick Bug	Jacksonville, Fla.	March 30, 1911	
*50 "...	35:32.31...	Buick Bug	Jacksonville, Fla.	March 28, 1911	
SPEEDWAY RECORDS, REGARDLESS OF CLASS					
*1/4 mile...	8.16...	Benz	Indianapolis, Ind.	May 29, 1911	
*1/2 "...	16.80...	Benz	Indianapolis, Ind.	May 29, 1911	
*1 kilo...	21.40...	Benz	Indianapolis, Ind.	May 29, 1911	
*1 mile...	35.35...	Benz	Indianapolis, Ind.	May 29, 1911	
ONE-MILE CIRCULAR DIRT TRACK RECORDS					
1 mile...	48.72...	Benz	Brighton Beach, N. Y.	July 4, 1911	
	48.62...	Benz	Brighton Beach, N. Y.	Sept. 4, 1911	
	47.85...	Benz	Brighton Beach, N. Y.	Sept. 7, 1912	
2 miles...	1:37.89...	Benz	Brighton Beach, N. Y.	Sept. 2, 1911	
*10 "...	8:16.40...	Peugeot	Peoria, Ill.	Sept. 9, 1914	
*15 "...	12:47.00...	Peugeot	Bakersfield, Cal.	Jan. 3, 1915	
*	12:23.20...	Peugeot	Bakersfield, Cal.	Jan. 3, 1915	
20 "...	17:10.60...	Peugeot	Springfield, Ill.	Sept. 19, 1914	
*	16:25.60...	Peugeot	Bakersfield, Cal.	Jan. 3, 1915	
25 "...	21:37.60...	Peugeot	Springfield, Ill.	Sept. 19, 1914	
*	20:28.80...	Peugeot	Bakersfield, Cal.	Jan. 3, 1915	
*50 "...	40:37.80...	Peugeot	Bakersfield, Cal.	Jan. 3, 1915	
*75 "...	1:08:56.00...	Peugeot	Galesburg, Ill.	Oct. 22, 1914	
100 "...	1:41:00.4...	Buick	Columbus, O.	July 3, 1909	
CLASS "B" SPEEDWAY RECORDS (STOCK CHASSIS PISTON DISPLACEMENT) 301					
TO 450 CUBIC INCHES					
*250 miles...	4:38:57.4...	Buick	Indianapolis, Ind.	Aug. 19, 1909	

Those marked \* are now held by Burman.

1914

Won Elgin trophy and C. A. C. cup at Elgin and Vanderbilt cup.

1915

Won 500-mile Indianapolis speedway race.

### SUGGESTS REMEDY FOR A KNOCK States Noise Comes from Valve Tappets— May Be a Slap

Harlingen, Tex.—Editor Motor Age—I think the following data will be of some value to G. W. Davis, Chicago, Ill., in Motor Age issue of Aug. 13, 1915, referring to his 1913 Hupmobile which knocks. The noise described is caused by a poor valve tappet retaining screw adjustment and hardly the valve. The best way to remedy this trouble is to purchase H-151 valve tappet and H-149 valve tappet retaining screw, shown in Fig. 3. This will cost 58 cents. It is not entirely necessary to replace H-146 valve tappet bushing, as this will wear longer than the tappet, but it is best to have both. In adjusting valve tappet resetting screw, it would be best to do this while the motor is running. First locate the noise. To adjust: Loosen H-150 valve tappet retaining screw lock nut, screw in on H-149 valve tappet retaining screw until valve holds open; tighten on H-150 valve tappet retaining screw lock nut; then back

off on both until lose enough to allow valve tappet to move up and down without binding; retightening H-150 valve tappet retaining screw lock nut, at the same time holding valve tappet retaining screw in place with screw driver. If this does not overcome the trouble after all valve tappet retaining screws have been thoroughly tested for noise, inspect the cam-shaft and magneto shaft, silent chain for play. The play can be taken up by placing shims under the magneto. If it is a valve slap, the best way to remedy this is by using a resetting tool of the proper size; ream out the valve seat, put in a new valve and grind in with fine grade valve grinding compound.

As to misfiring with retarded spark, there should be no trouble with the Bosch magneto. This could be poor adjustment of breaker points. Look at the spark plugs, the points burn away badly. Have the carburetor cleaned. One of the best-running cars in my town is model H Hupmobile, 1913, which I have just overhauled.—Wesley J. Bailey.

### Meaning of Displacement

Osceola, Ark.—Editor Motor Age—In talking about a racing car, what is meant by a 300- or 350-inch car?—A Reader.

The figure refers to the displacement of the motor. The displacement is the

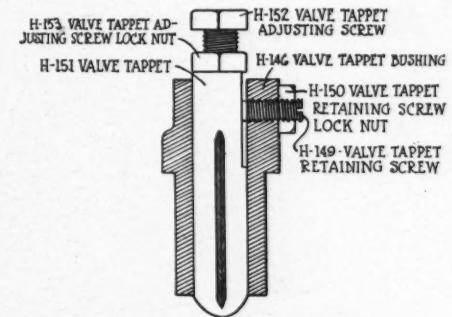


FIG. 3—REMEDY FOR A KNOCK  
Hupmobile repairman claims that knock is caused by poor adjustment of one or more valve tappet retaining screws



FIG. 4—REDE-SIGNED FORD

How Indiana reader transformed a Ford into a speedster. It is fitted with Houk wheels, a V-shaped radiator and Atwater Kent ignition

cubical contents of the space swept by the pistons. Thus, a four-cylinder motor with a bore of 3 inches and a stroke of 5 inches has a displacement of 141.4 cubic inches. The formula for displacement is  $D^2 \times 7.854 \times N \times S$

where D is the bore in inches  
N, the number of cylinders and  
S, the stroke.

Thus, for the motor mentioned, we have  $3 \times 3 \times .7854 \times 4 \times 5$  or 141.4 cubic inches.

In some races, such as that held at Chicago and at Indianapolis, only cars with motors of 300 cubic inches displacement or less were allowed to start.

**DURAY'S FIAT A FOUR, 7.48 BY 10.4**  
Made Unofficial Record of 142.9 M.P.H. at

Ostend, Germany

Union City, Tenn.—Editor Motor Age—Is the four-cylinder motor considered best as a racing motor?

2—What is the fastest track in the world? How does the Chicago Speedway rank?

3—Was Duray's record at Ostend official, and how much faster was it than Burman's at Dayton? Give dimensions of both motors.

4—What is the most powerful racing car now in existence? Give its motor dimensions.

5—How do race drivers get their start in the business and do most of them own their own machines or are they backed by someone?

6—What is the fastest speed ever traveled by man and what was it in?—D. B. Wheeler.

1—The four-cylinder has shown up better than the six in racing and now is used exclusively by American builders in the racing game. It is preferable to the six because of its greater efficiency, weight, etc., considered.

2—The fastest track in the world is that at Brooklands, near London, Eng. The Chicago track ranks second.

3—Duray's time was not considered official because the car was driven only in one direction and the foreign rules call for driving in both directions. Duray traveled a kilometer at the rate of 142.9 miles per hour, in a 300-horsepower Fiat. Burman, in a Benz, traveled at the rate of 141.73 miles per hour for 1 mile.

Duray's Fiat is a four-cylinder, 7.48 by 10.4, and the Blitzen Benz also is a four-cylinder, 7.28 by 7.87.

4—Judging from speed performances, the Fiat driven by Duray should rank first.

5—Race drivers usually get their early training in a motor car factory or by assisting in the work around a racing camp. After serving as mechanic for a few years, some minor race work is done

and then he is ready for entry in one of the big meets.

The average racing driver does not own his own machine, but drives a factory entry or one owned by a sportsman.

6—Duray in his Fiat traveled faster than any other human being.

**DESIGNS A FAULTY CONDENSER**  
Places it Below Radiator—Latter May  
Become Broken

Roswell, N. M.—Editor Motor Age—In Fig. 2 is a drawing of a condenser for use on motor cars, and would like to know if it would be practical.

Would such a device condense the steam and return it to the radiator, thus keeping it full at all times?

2—Would a 2-gallon tank be large enough to be used for the condenser?

3—How many feet of pipe, say  $\frac{1}{4}$ -inch copper pipe, would be necessary in the coil to condense the steam from any ordinary car?

4—Would there have to be a check valve in water line to compel steam to go down overflow pipe?—Reader.

1—It appears that your condenser will not do the work, for you depend upon steam pressure to force the water back to the radiator. Your water head is so great because the condenser is below the radiator that the pressure might be sufficient to break the radiator. If you place the condenser above the radiator it will work.

2—You could use a 1-gallon tank, provided your condensing coil is small enough.

3—One to 2 feet of pipe would be sufficient.

4—If the condenser is above the radiator you will not need any check valve.

**MEANING OF LOADING CARBURETER**

Term Refers to Feeding of Rich Mixture  
Because of Condensation

Yukon, Okla.—Editor Motor Age—What is meant by loading carbureter as stated in July 22 issue in the Readers' Clearing House section under heading of "Knocks When Pulling Slowly"?

I have recently had my 6P40 Thomas overhauled and it seems to knock considerably, pulling slowly and retarded spark does not have any apparent effect, and I wonder if what you called loading carbureter is the cause.—George E. Bass.

A loading carburetion system is one in which there is excessive condensation, thus making the mixture too rich and causing trouble. A motor with a very long inlet manifold is apt to load up, as it is called, at low speeds because the flow of mixture through the manifold is so slow comparatively that there is an opportunity for condensation. The liquid gasoline resulting from the condensation, drops down into the carburetor and is carried up again into the motor. The real trouble, however, is caused

by the gasoline globules traveling to convenient cylinders only, leaving one or two perhaps free to get a good mixture.

The remedy for loading, is to get additional heat to the manifold so as to assist vaporization, or change the manifold.

**PECULIAR TROUBLE WITH IGNITION**  
Motor Runs Only with Certain Wire Dis-connected

Paincourtville, La.—Editor Motor Age—The writer has just returned from a 700-mile trip, which trip was made in a Buick C-25. While on the road about 150 miles were made in very bad weather and heavy rains and that part of the country having no gravel or hard-surfaced roads we had to go through deep mud and water. We had no trouble with the car the whole trip, with the exception of only one tire puncture. The motor worked simply fine, with the exception that in the Delco system the condenser of same failed to work, that is, when the wire from the distributor or timer was connected the motor would not run, and when the same wire was disconnected the motor would run. I could not start motor at all other than when this wire was disconnected. What was the cause of this trouble, bearing in mind the above condition of road and weather, etc.?—E. C. Landay.

Motor Age cannot account for this action except that the wires were tampered with and that by connecting the wire and throwing the switch to on position the timer was shorted, thus making the system inoperative. By disconnecting the wire and throwing the switch the circuit was completed.

**ANOTHER REDESIGNED FORD CAR**  
Uses Houk Wire Wheels, Atwater Kent  
Ignition and Speedster Body

Gwynneville, Ind., Editor Motor Age—The illustration in Fig. 4 shows a remodeled Ford car which has been renamed the Fierce-Arrow. This car is owned by R. H. Arvin, Indianapolis, Ind., and he has equipped it with Houk wire wheels, Atwater Kent ignition, V-shaped radiator, streamline hood, speedster body, detachable fenders and a larger steering wheel.—Geo. S. Wilcoxon.

**GETTING MORE SPEED FROM MOTOR**  
Pennsylvania Reader Wishes to Re-construct His Ford Car

Carmichaels, Pa.—Editor Motor Age—Is it possible to reconstruct a Ford machine into a speedy-looking racing machine? Could enough speed be secured to do 60 miles per hour or over without installing a motor of some other make and power?

2—Can Motor Age supply me with an illustration of a Ford reconstructed for speed work?—W. G. Hart.

1—With the proper reconstruction you can get your Ford to show 60 miles per hour. This has been done by a number of Motor Age readers.

One states that the first step in the conversion of a Ford into a speedster is to remove all the unnecessary parts, such as the running boards, fenders, body, etc. The steering post is dropped slightly and bucket seats fastened in the frame. A pressure fuel feed system is fitted and a pump attachment for forcing oil to the motor crankcase. The motor then is disassembled and the bearings carefully fitted, the main bearings being worked in by turning the flywheel by a belt for 4 to 6 hours.

The connecting rod bearings are cut with oil ducts to insure good lubrication. The oil feed pipe which passes through the motor is made larger, and with openings about

equal distances for each connecting rod drop. The funnel attachments are made five to six times larger than the ones supplied.

Lighter pistons of aluminum alloy are used and all four pistons should weigh the same. The rods also should be equal in weight. Larger inlet valves are used.

The piston rings are carefully lapped-in with an old piston and then fitted to the regular piston. About  $3/64$  to as much as  $1/16$ -inch of metal is removed from the cylinder head, this work being accomplished easily, for the cylinder head is removable. The flywheel is made a little larger in diameter to get added weight. With the above changes the compression should be in the neighborhood of 60 to 75 pounds per square inch.

The present intake manifold is discarded and a brass one about  $1/4$ -inch larger fitted, care being taken to see that the inner surface is smooth. The high-tension magneto has been found to give better results than the system of employing coils.

The rear axle reduction can be made  $2\frac{1}{2}$  to 1.

2—A Ford reconstructed for speed work is shown on this page. In the past eight issues of Motor Age there appeared in the Clearing House department many illustrations of reconstructed cars and you will gain many hints by studying these illustrations.

#### MISFIRES BETWEEN 17 AND 21 M. P. H. Due to Too Rich a Mixture—Cut Down Fuel Supply on Low Speed

Kellerton, Ia.—Editor Motor Age—What is my trouble? I have a model 1 Maxwell equipped with Schebler model L. Running idle the engine works well. When the car is going all is well until I reach 17 miles per hour. From that to 21 miles the motor spits and coughs, sometimes acting as if mixture is too rich, sometimes as if too lean. Opening throttle wider motor picks up and goes to perfection. No trouble except at the 17 to 21 clip. Garage men and experts fail to relieve my trouble. What is your suggestion?—Victor West.

The motor, in all probability is getting too rich a mixture at speeds between 17 and 21 miles per hour and it is suggested that you adjust the low-speed as lean as possible, so that by lifting the air valve even slightly the motor will stop. Also look at the cam and see that it is not

jammed against the carburetor body at any point in its travel. The method of adjusting the Schebler model L for all speeds was described in the August 26 issue of Motor Age in this department.

#### QUESTIONS ON ELECTRICAL SYSTEM Jesco System Uses Inherent Regulation— Gearsets on Racing Cars

Bayside, L. I.—Editor Motor Age—Does it make any difference in which direction a generator is driven?

2—How is the regulation of current managed in the Marathon car, which uses the Jesco system, which has neither ammeter nor automatic cutout? Please tell how this unit drives and is driven.

3—How many speeds is the usual racing car, and if more than two why are more necessary?

4—Why is it necessary to use such large conducting cables running from the starting motor to the battery?—Anton Brady.

1—This depends upon the type of generator. Some can be operated in either direction while others can be run in one direction only in order to get efficient results.

2—The Jesco system on your car has inherent regulation. There is a cutout employed and this is located in a small box on top of the motor generator. The unit is driven by silent chain from the front end of the crankshaft.

3—The average racing car has a three-speed gearset. In speedway racing only two speeds really are necessary but in road racing three are needed because on the turns shifting often is necessary from third to second.

4—The heavy cables are needed because of the large current-carrying capacity of these wires.

#### THIS MOTOR HAS PECULIAR KNOCK Valve May be Slapping, Piston Loose or Push Rod has Side Play

Trenton, N. J.—Editor Motor Age—I have a knock in 1913 Ford which I cannot find. I can hear it twice every fourth explosion and it sounds like tapping a piece of steel with a tack hammer. I have overhauled the motor, putting in new camshaft bearings, new push rods and new valves and also tightened all the bearings. I intended putting oversize pistons in, but my repairman told me that new rings would answer better, so I took his advice. I installed an Atwater Kent ignition system. This knock can be heard at all times, although it is more distinct when the spark is halfway advanced. Could Motor Age give any information in regard to this knock?—R. E. S.

It is quite difficult for Motor Age to state just what is causing this knock or

slap, but if it is of sharp metal-to-metal sound as you say, it might be a valve slap. Turn the valves around on their seats by grasping the springs firmly. If this does not remove the slap you may have to grind in the valves. Examine the push rods and feel for side play. It is possible the rings were not fitted properly on one piston with the result the piston is loose and is slapping against the cylinder.

#### RACERS USE UNADULTERATED FUEL Technical Committee Takes Samples of Gasoline Before the Start

Hamilton, O.—Editor Motor Age—Do Speedway officials allow the use of any special gasoline or any chemicals mixed with the gasoline used as fuel to give the motor more power in races held by them?

2—What may be mixed with plain gasoline that will give a motor more power when running at high speed?

3—The illustration in Fig. 5 shows my Ford car after I redesigned it. Some readers of Motor Age may get some ideas on reconstruction from the picture.—R. F. Hoffman.

1—Only unadulterated gasoline may be used in races. The technical committee at these races takes fuel samples while the cars are on the starting line and these samples are later analyzed to determine whether or not they contain any adulterant.

2—Ether or picric acid may be used to get more power but Motor Age does not advise the use of these substances because they are detrimental to the motor parts. If you wish to increase the speed of your car read the answer to W. G. Hart.

#### Horsepower at Same Engine Speed

Findley Lake, N. Y.—Editor Motor Age—Kindly advise what the difference in horsepower of the following engines is: One having  $3\frac{3}{4}$  bore by 4-inch stroke and one having  $3\frac{3}{8}$  by  $4\frac{1}{2}$ -inch stroke, both running at same number of revolutions.—J. J. Brookmire.

You do not state the number of cylinders so Motor Age will assume you mean four.

The  $3\frac{3}{4}$  by 4 motor is rated at 22.5 horsepower at 1,000 feet per minute piston speed and the  $3\frac{3}{8}$  by  $4\frac{1}{2}$  motor, at 20.3 horsepower at the same piston speed. In the former this means 22.5 horsepower at 1,500 r. p. m. and in the latter 20.3 horsepower at 1,333 r. p. m., or about 23.8 at 1,500 r. p. m.

#### Brass for Bushings

Bloomingburg, O.—What machinery is necessary to accurately ream out valve guides for oversize stems?

2—What material should be used for valve guide bushing?

3—Should valves in exhaust and intake be of same material?—Subscriber.

1—A reamer can be used to enlarge the valve guides.

2—Brass is good.

3—The inlet valves do not have to be made of as good heat-resisting material as the exhausts. If possible, use tungsten-steel for the exhausts.

#### Haynes Uses Own Motor

In the August 19 issue of Motor Age, in answer to an inquiry by Alfred B. Stratton, it was stated that the Haynes company uses a Continental motor in its cars. This is not correct, according to information received by Motor Age from the Haynes company, as this concern uses motors made in its own shops.

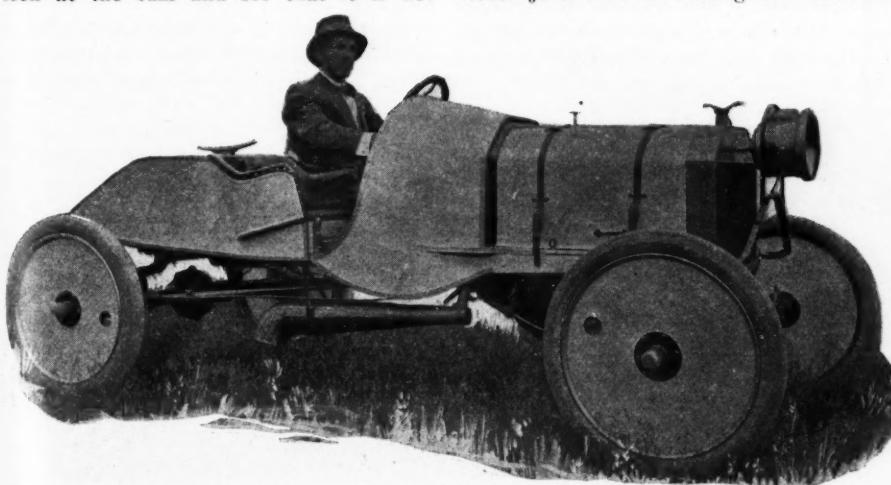
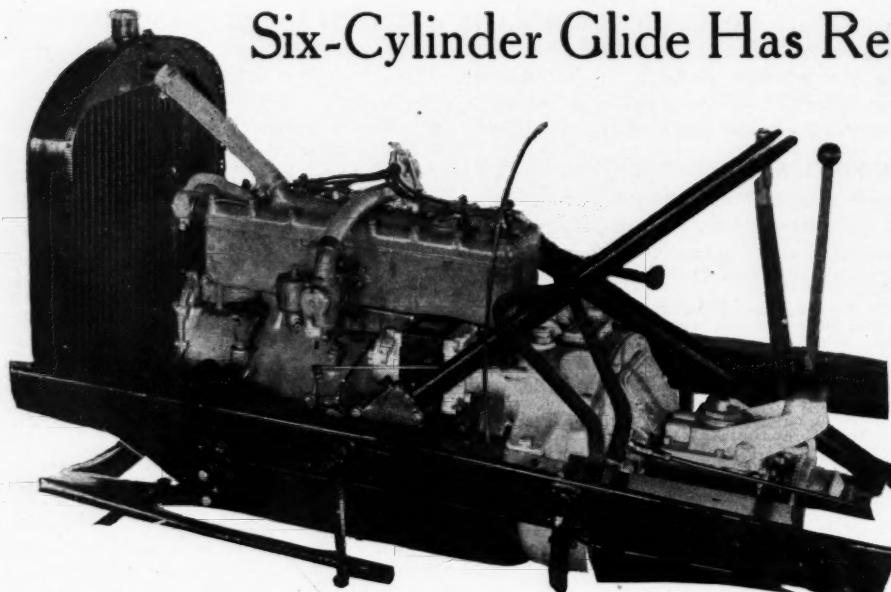


FIG. 5—R. F. HOFFMAN'S RECONSTRUCTED FORD CAR  
Notice the disk wheels, single headlight in front and peculiar rear portion

## Six-Cylinder Glide Has Removable Sedan Top

New Westinghouse Vertical Ignition System—Spiral-Bevel Reduction in Rear Axle



GLIDE POWER PLANT, SHOWING CARBURETER MOUNTING AND WESTINGHOUSE STARTER

FOR 1916 the Bartholomew Co., Peoria, Ill., is listing a six-cylinder, five-passenger car, known as Glide 6-40, at \$1,095. The make-up of this car, including the unit power plant, made up of a Rutenber motor, Brown-Lipe gearset, multiple-disk clutch, includes a floating axle with spiral-type bevel gears. The wheelbase measures 119 inches; tires are 34 by 4, and equipment is complete throughout the car.

### Accessible Motor

The unit powerplant is an L-head, block-casting, with cylinders 3 by 5, giving a piston displacement of 212.7 cubic inches, and a horsepower rating of 21.6. In the unit powerplant construction, the flywheel is entirely inclosed, the housing forming two points of support for the combined motor and gearset. The motor equipments are well divided: On the right or valve side where the valves are inclosed with the usual cover plates are mounted the water pump and the Westinghouse ignition system, comprising the generator and the vertical-type unit, consisting of an interrupter, condenser, coil and distributor, which is entirely independent of the generator for its proper performance. The generator is driven through a continuation of the pump shaft. The pump and generator are both located low, leaving the valve stems accessible and locating the vertical ignition unit almost midway of the motor block prevents it from interfering with valve stem accessibility.

On the opposite, or left side, are located the Westinghouse starter, snugly placed at the left rear between the crankcase and the steering column, its drive through the flywheel being through the well-known Bendix automatic system. Centrally located on the left side is the carburetor which attaches direct to the cylinder block, thus eliminating the intake manifold and limiting the piping to a hot-air duct extending over the top of the cylin-

der block to a heating box or drum mounted between the exhaust manifold and the cylinder head on the right side. It is fed by the Stewart gravity-vacuum tank system. Slightly in advance of the carburetor and in a most accessible position is the large funnel-shaped oil filler, and mounted between the frame and the crankcase at the left is the electric horn, located where it does not interfere with any of the motor parts.

The Rutenber motor with a rating of 21.6 horsepower, which is based on a piston speed of 1,000 feet per minute, shows, according to the company's power chart, 22 horsepower at 1,000 r.p.m.; at 1,500 r.p.m. the horsepower output is placed at 33, or exactly 50 per cent greater than at 1,000 r.p.m., and at 2,000 r.p.m., it is 41.

### Lubrication System

Motor lubrication is maintained through a vane pump, driven direct from the front end of the camshaft and delivering oil through troughs under the connecting rod and also under the timing gears. The main bearings of the crankshaft are oiled by ducts cast in the walls of the crankcase. There is a complete re-circulation of oil, with the usual filtering between successive circuits through the motor.

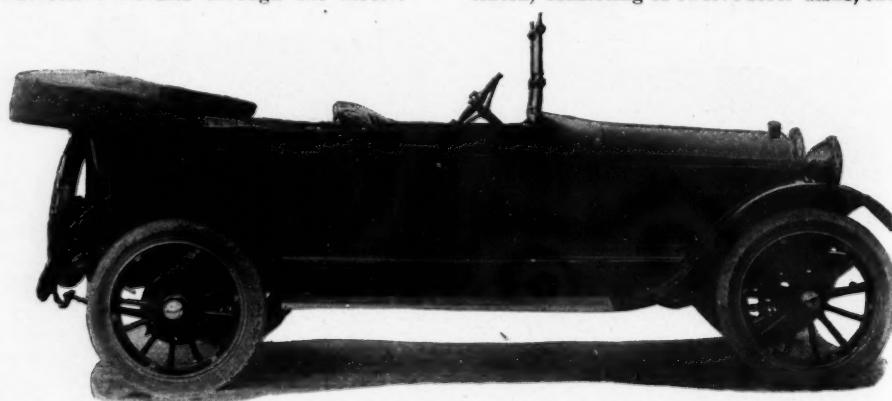
The complete electrical system is the Westinghouse equipment, the greatest novelty of which is connected with the new 1916 design of generator and the vertical ignition system. The vertical ignition system is entirely separate from the generator so far as its electrical functions are concerned in that it draws its current direct from the 6-volt 80-ampere battery. The electrical unit incorporates four essentials, the interrupter mechanism in the primary circuit, a distributor for the high-tension or secondary current, the step-up coil by which the current is translated from a low-tension to a high-tension one, and lastly, the condenser in connection with the coil. All are contained in one compact housing. If necessary, this vertical unit can be entirely removed from the generator, although it is mounted on the front end of it and is driven from the generator shaft by spiral gears running in oil. Wiring in connection with this new system is simple, consisting of six secondary wires to the plugs, and a single low-tension wire to the switch.

### The Westinghouse Generator

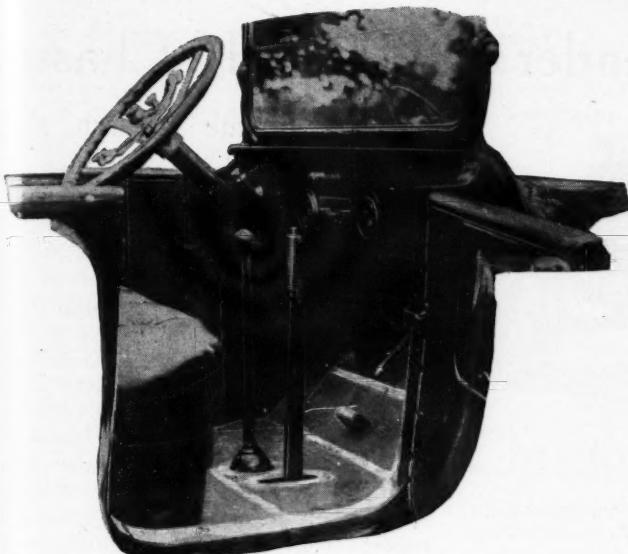
The generator is fitted with a voltage regulator maintaining a constant voltage of approximately 6.7 volts at all speeds. It begins charging the battery at 350 r.p.m. of the crankshaft and at 12 miles per hour or thereabouts is delivering 8 amperes. The generator is a new compact barrel-type and connects to the pump shaft by a large leather coupling. The ammeter on the instrument board shows the rate of battery charged.

The Westinghouse starting motor is the conventional Westinghouse design which drives the flywheel through a Bendix coupling.

The first unit in the transmission system is the completely-inclosed, multiple-disk clutch, consisting of twelve steel disks, one



THE GLIDE SIX-FORTY READY FOR THE ROAD



GLIDE CONTROL AND INSTRUMENT BOARD. NOTE ACCELERATOR PEDAL FOOTREST

half of which are faced with Raybestos, and the other half not. The gearset, which bolts direct to the bell housing inclosing the flywheel, is a three-speed set with gears 3½ per cent nickel steel. A tubular propeller shaft with Spicer universal joints connects the gearset with the rear axle, there being neither torque tube nor radius rods, the three-quarter elliptic springs not only absorbing the torque of the axle, but also transmitting the drive from the axle to the frame.

#### Rear Axle Ratio

The axle housing is a pressed steel piece with the differential and drive pinion mounted on a steel casting supported within the housing. The drive pinion and shaft are one piece. Spiral-bevel gears are used, the ratio being 4.64 to 1 of engine speeds on direct, which is considered sufficient to allow the motor to operate at its most efficient speed on hill-climbing and cross-country work.

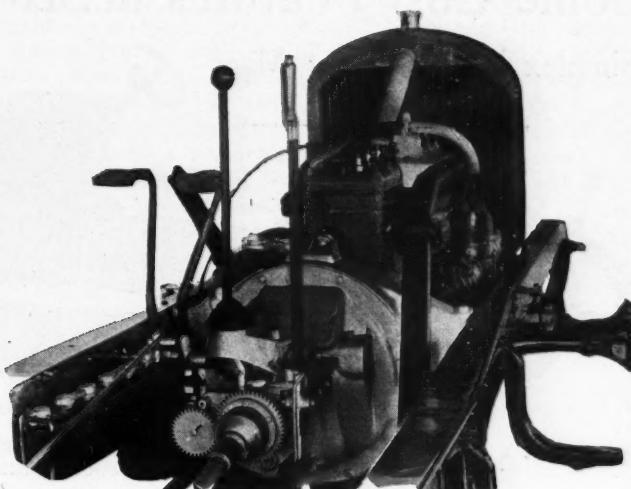
Braking system consists of a double set of internals and externals on the rear wheels, both sets operating on the same drums, which are 14 inches in diameter and 2 inches wide. The external set is the regular service brake and the emergencies are the expanding ones.

The front axle and steering connections are conventional, the axle being a single-piece forging. The axle is mounted to produce a castor effect.

Steering is through a screw-and-nut gear with an 18-inch hand wheel. Throttle and spark levers are on the wheel, with a horn button centrally located on the latter. Front springs are 34 by 2, semi-elliptics, and rears, 48 by 2, three-quarter elliptics, mounted beneath the axle.

#### Two Bodies

The body is a five-passenger streamline type, with the bonnet lines almost as high as the cowl, there being an imperceptible rise at the cowl, where the vertical windshield is carried. The front seats are set well into the body and rise but slightly



GLIDE POWER UNIT, SHOWING SPEEDOMETER DRIVE ON PROPELLER SHAFT

above the top line. The two-piece windshield is set so that both upper and lower glasses may be tilted for ventilation and rain-vision. The equipment includes one-person top with Jiffy curtains; electric headlights with two sets of bulbs, larger in focus for road driving and the smaller bulb for city use; Stewart speedometer driven from the propeller shaft; Goodyear demountable rims with one extra rim.

An extra body combination is the detachable sedan top, which fits on to the regular touring body. This top is built around the hard-wood frame, which is so ironed as to avoid rattling. The deck of the top is covered with whipecord or Bedford. There is an electric dome light. This sedan top attaches by the top irons, fitting into the regular body irons used for the one-person top, and the front of the sedan fastens to the windshield. It is said that this sedan top can be removed or attached by two men in 1 hour.

#### OLDSMOBILE MADE WIDE TREAD

Lansing, Mich., Aug. 30—The Oldsmobile factory has opened an avenue for further trade expansion by arranging to supply wide-tread cars to dealers in many points in the south and other sections of the country where

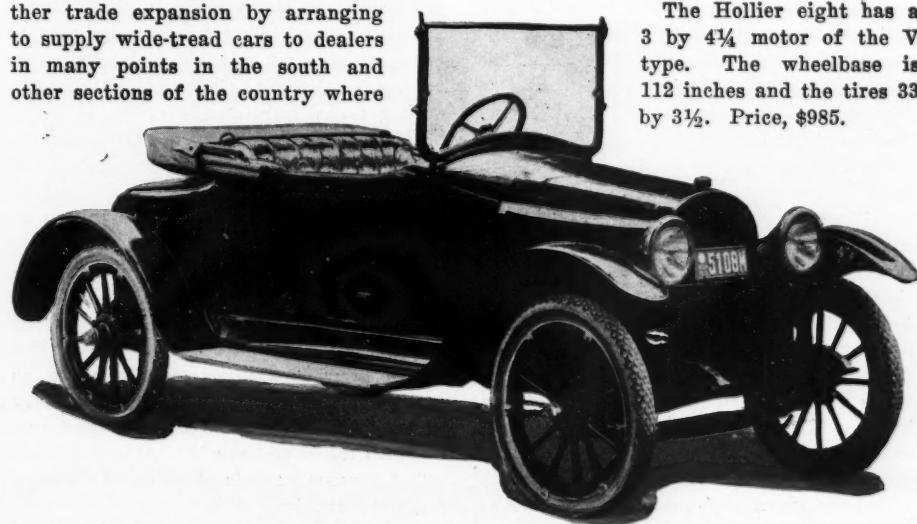
such cars are considered necessary, owing to sand roads. By the use of specially-constructed wire wheels an extra width tread has been obtained and the usual modifications of the chassis by lengthening the axle shafts thus have been obviated. These wheels are finished in an attractive light red enamel. A list price of \$1,162.50 for the four-cylinder Oldsmobile with wide-tread equipment has been announced, this price covering either the Model 43 touring car or roadster.

#### ADDS HOLLIER ROADSTER

Jackson, Mich., Aug. 28—The Lewis Spring & Axle Co. has added a roadster model to be fitted to its standard Hollier eight-cylinder chassis. The mechanical features of the car are identical with those of the touring model which has been described before.

The roadster has a seat wide enough to accommodate three, and in every way is up to the standard. Good lines have been given it by the shape of the rear deck which conforms gracefully to the general curve of the body.

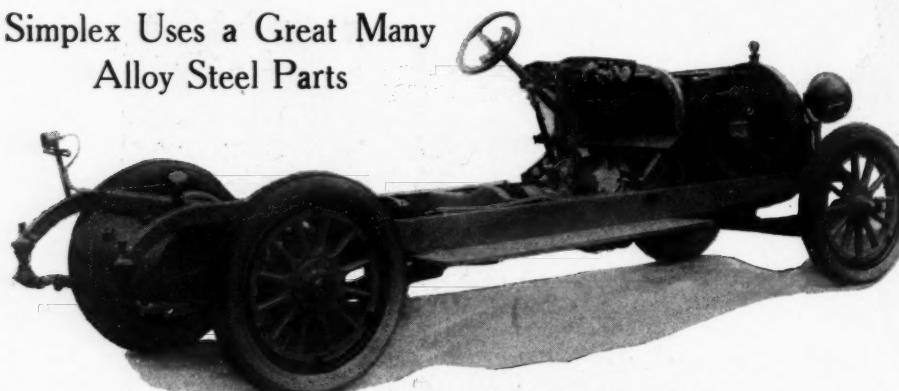
The Hollier eight has a 3 by 4½ motor of the V type. The wheelbase is 112 inches and the tires 33 by 3½. Price, \$985.



HOLLIER EIGHT, NEW MODEL ROADSTER

# Some Cost Features in Six-Cylinder \$5,000 1916 Chassis

Simplex Uses a Great Many  
Alloy Steel Parts



SIMPLEX CHASSIS, ILLUSTRATING BALL-AND SOCKET REAR SPRING CONNECTION



FORWARD VIEW OF SIMPLEX CHASSIS,  
SHOWING STURDY EFFECT

LISTING a chassis at \$5,000 suggests that there still remains a very considerable market for high-priced cars in not a few of our large cities. A 1916 chassis of the Simplex Motor Car Co., New Brunswick, N. J., is made at this price. This new Simplex has been brought out by Henry W. Crane, now the Simplex company engineer and formerly president of the Crane Motor Car Co., which for years has specialized on the production of high-priced cars. The new Simplex with a six-cylinder motor 4 $\frac{3}{8}$  by 6 $\frac{1}{4}$  inches, which it is claimed will develop in excess of 100 horsepower at 1,800 to 2,000 r. p. m., has a wheelbase of 143 $\frac{1}{2}$  inches, and uses 36 by 4 $\frac{1}{2}$  tires in front and 37 by 5 rear.

#### The Steels Used

In a chassis listing at this price special steels, the best in bearings, and the last word in equipment are looked for. In this respect electric furnace steel is very largely used throughout the car. The crank-shaft with a diameter of 2 $\frac{3}{4}$  inches is made from this kind of steel; in the four-speed gearset, both axles and shafts are made from this steel; in the rear axle the axle tubes are nickel steel, the differential and housing a cast steel part, the spiral bevel gears within the axle are electric furnace steel, and the shafts are of alloy steel. This program of high-grade steel is carried into the other parts of the car. The frame of alloy steel is but 30 inches wide in

front, but increases in width to 44 inches at the rear, the great width under the body allowing a light construction and the narrowness in front giving good turning. The depth of the flange of the side members is 6 $\frac{1}{2}$  inches and the running boards attach direct to the lower flange, thus avoiding the use of splash guards. For the engine support there is a subframe made up of two deep channel members, fitted to the side members at the front, and to the cross members in the rear.

The spring suspension is unique in that semi-elliptics are used front and rear, the rear set measuring 62 inches in length and taking both the axle torque and the drive of the car. The rear spring support at the rear end is by ball-and-socket connection, used to give increased flexibility at this point.

#### Accessible Valves

The powerplant is a combined unit of six cylinders, disk clutch and four-speed gearset mounted with three-point suspension. The flywheel housing has two of the supports in a unit with it, and a third point is at the center of the cross member at the front of the radiator. The cylinders are cast in two blocks of three, with the head integral and with both the exhaust and intake on the left; in fact, it has been made a special point to keep the valves free and clear by making them the only external part of the motor which is on that side, excepting the carburetor, located between the cylinder blocks. All the auxiliaries such as the power tire pump, generator, magneto and starting motor are on the right side. I-beam connecting rods, are machined on all sides for lightness, the machining not only taking off the excess material but forming an excellent method for detecting poor forgings. The connecting-rods are not only balanced as regards weight, but the centers of gravity of each are determined carefully and precautions taken to have the centers of each set of connecting-rods at an equal distance from the crankpin axis.

A second motor feature is the length of the pistons, which is 6 $\frac{1}{8}$  inches. There

#### Special Frame Design and Half-Elliptic Springs

are four piston rings at the top of each, these being of the concentric type peened by a patented process which indents the inner side of the ring a uniform amount all around the circumference, giving a uniform tension on the ring and when in position providing a ring which gives equal bearing surface all around the cylinder.

Silent chain drive is used for the cam-shaft. This is a wide-space chain. The shaft is carried on three large bronze-lined bearings so arranged as to allow the removal of the cam-shaft through the front of the case.

Oiling is by pressure feed and the lubricant is carried positively from a gear pump operated by special drive from the cam-shaft from the oil reservoir in the lower half of the crankcase to a distributor housing mounted in an accessible position on the left side of the crankcase. This distributor has a large strainer through which the oil first passes, and an overflow valve which acts as a by-pass pressure regulator keeping about 10 pounds pressure on the system at all but low engine speeds. There three leads from the distributor, each one going to a main bearing and carrying the oil directly to these under pressure. In addition to these three leads there is a smaller one which carries oil to the silent chain cam-shaft drive.

There is no oil lead up the connecting-rod as sufficient oil has been found to be thrown upwards from the revolving cranks. In fact, in order to prevent an excessive supply of oil, baffle plates have been introduced between the cylinders and the crankcase which allow the connecting-rods to work only through comparatively narrow slots.

#### Twin Exhaust System

In order to cut down any possibility of back pressure, due to overlapping explosions, a twin exhaust system is used, each block of three cylinders exhausting into a separate manifold. The pipes are carried down at the front end of each block and then curve backwards. This gives a compact manifold design which is so arranged as to get the hot gases away from the motor as quickly as possible.

One saw-steel disk is used in the clutch which is built into the flywheel casting. This steel disk is carried on a splined shaft leading to the gearbox and is mounted between two multibestos rings, one of which is riveted to the flywheel and the other to a heavy ring which forms the driven member and which is pressed against the steel disk by means of twelve spiral springs. Since the clutch is continually kept in an oily condition it is necessary, in order to maintain a positive drive without slip, to have unusually strong

springs and to accommodate these and at the same time render it easy for the driver to remove the clutch, care is taken to provide a strong leverage in the pedal arrangement.

Extending back from the rear of the motor is a bell-shaped extension, forming a housing for the flywheel and clutch and also the forward end of the gearbox. The latter contains a gearset which provides four forward speeds. Heavy oil is used in the gearbox and there is an oilproof housing between the gearset and the clutch to prevent any leakage of oil from the gearset into the clutch.

Hotchkiss final drive is employed in connection with a floating axle, in which attention has been given to securing a wide bearing spread for rigidity. The shafts are high-tensile alloy steel and the tubes are nickel steel bolted to a central cast-steel housing. This has an exceptionally large removable cover which renders accessible the rear axle driving gears which can be removed through this opening. The driving gears are of electric furnace alloy steel of spiral-bevel form and are carried on a double row ball bearing in front of the pinion and a single row behind. The large gear is mounted on the differential which is a four-pinion design carried on annular ball bearings. The bearing arrangement at the outside end of the axle tubes are so arranged by turning the hub inward that the axle is considerably shortened, giving a saving of weight and also an increase in rigidity. The wheel is carried on a double row ball bearing mounted directly on the center line of the hub and a single ball is located at the inner side.

#### Uses Gearbox Brake

The service brake is carried on the drive-shaft and the hand brake on the rear wheels. The drum diameter of the hand brake is 14 inches and the face width 2½. Adjustment on these brakes is provided by a nut at each wheel. The service brake, which is mounted on the propeller shaft just back of the gearbox, is a contracting band design lined with Multibestos having a drum diameter of 10½ inches and a face width of 4 inches.

An I-beam section front axle, which is so arranged at the knuckles that the wheels pivot at the point of contact between the tire and the road, is employed. Since the axle and knuckles are of electric furnace alloy steel they can be made of comparatively light section. The knuckle pin is fitted in bronze bushings and the load is carried on hardened washers bearing against the bushings. The hubs are forged steel and are equipped with roller bearings. The spring clips are of alloy steel and the steering rod connections are ball-and-socket type with extra large bearing surface. All the moving parts of this linkage are packed in grease and covered with leather boots.

Steering is by worm and full gear, both the worm and gear being hardened steel and the wormshaft being fitted with thrust

bearings. The gears are enclosed and operate in heavy oil.

In the fitting and equipment of the chassis, everything has been done to promote reliability and long life. Throughout wherever possible, bushings take the wear to avoid the possibility of having to purchase expensive parts when a bushing replacement will do. Starting and lighting is by the Rushmore system and for ignition a high-tension dual outfit is supplied. The radiator is a cellular patented design carried on a cross member over the front axle. It is cooled by a 2-inch aluminum

fan. The lines of the radiator are carried to the hood and cowl and hood clamps which provide against the possibility of rattle ever developing are fitted. Yale locks are supplied on each side of the hood and the cowl board is fastened to the dash and is independent of the body and cowl. The instruments on the cowl board are complete, including a speedometer, oil and gasoline pressure gauges, ammeter, gauge lamp, hand pressure pump, lighting switches, ignition coils, carburetor mixture regulator, voltmeter and clock.

## Chicago Electrics Reduced in Price

**\$615 Cut on 1916 Models—Marketing Arrangement Provides for Battery Rental**

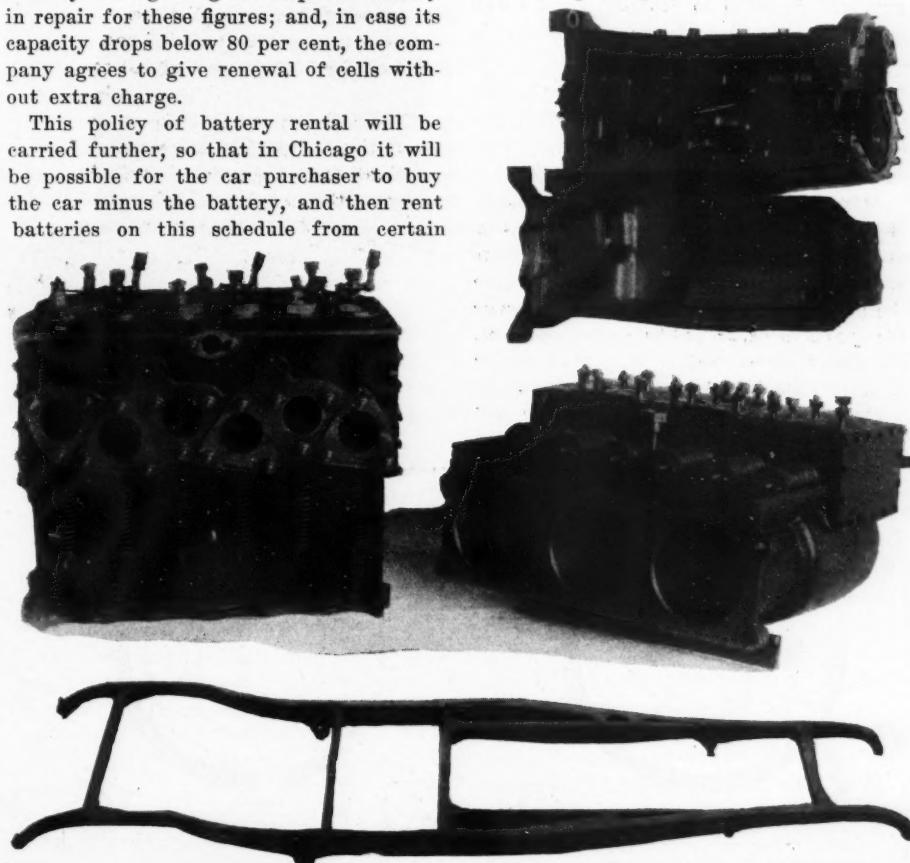
CHICAGO, Aug. 30—Besides cutting the price of its electric passenger vehicles \$615, or over, the Walker Vehicle Co., Chicago, has gone a step further on its 1916 Chicago models in that it is prepared to sell these cars without a battery, deducting \$270 from the list price in case the car is sold minus the battery. This selling without the battery applies only to the city of Chicago, where the company is prepared with a battery rental policy, under which the purchaser rents a battery at \$20 a month for the first year and \$16 a month for succeeding years, the Rental Battery Co. agreeing to keep the battery in repair for these figures; and, in case its capacity drops below 80 per cent, the company agrees to give renewal of cells without extra charge.

This policy of battery rental will be carried further, so that in Chicago it will be possible for the car purchaser to buy the car minus the battery, and then rent batteries on this schedule from certain

electric garages, with whom contracts covering the battery rental can be made.

This battery rental problem promises to extend further than new cars, and to embrace owners of cars who will want to turn in their old battery and start on the rental basis, in which case several of the garages will take in the old battery and rent a new one at the rate of \$16 per month.

In its line of 1916 electrics the Walker company lists four models, three of which sell at \$1,985, as compared with \$2,600, a reduction of \$615. Two of these models are four-passenger, rear-drive, inclosed



DETAILS OF SIMPLEX CHASSIS CONSTRUCTION, SHOWING RIGID CRANKSHAFT, ARRANGEMENT OF VALVES IN CYLINDER CASTING AND THE NOVEL DESIGN OF FRAME

types, and the third is a cabriolet roadster. All three are built on a 96-inch wheelbase chassis. The other Walker model is a five-passenger limousine type, with front drive, and built on a chassis of 104 inches. It lists at \$2,150, as compared with \$2,800 formerly, a reduction of \$650. This limousine has a roomy interior 78 inches in length, yet the vehicle can be turned in a circle 38 feet in diameter.

Several body refinements have been made in all of the models. There is a more general use of aluminum, particularly in those parts exposed to the weather. Sashless windows are used, these being raised or lowered mechanically through a lever. The glass is set deeply into the body frame in a special cement, doing away with the use of keep-stakes.

The 1915 type of front window is used, allowing of complete opening in warm weather and in addition an auxiliary windshield is furnished to give a clear vision effect in bad weather. A new crown type fender design is used. The body equip-

ment includes all such fitments as dome lights, reading lamps, arm rests and swings, concealed toilet case, smoking set, clock and recording instruments.

#### Chassis Details

The chassis details follow closely on 1915 design. The motor is direct, connected by shaft drive with two universals to the rear axle, where spiral-type bevel gears are employed. The controller system furnishes five forward and reverse speeds, the speeds being 5, 8, 15 and 22 m.p.h., except on the cabriolet, which has a maximum of 25 m.p.m. In addition to the electric brake, there is a contracting band brake on the propeller shaft operating in a 10-inch drum. Front and rear axles are Timken products.

Where cars are sold with batteries, the equipment consists of either Exide or Philadelphia cells.

Tire equipment is 36 by 4½ Firestone, notch, dual tread, cushion, and where wire wheels are used, Ridge-Whitworth are furnished with 34 by 4½-inch Silvertowns.

## Device Assists Magneto Starting

### Impulse Starter Designed to Be Fitted to Instruments Now in Service and Give Hotter Spark

THE Eisemann Magneto Co., Brooklyn, N. Y., has developed an attachment for magnetos which it calls an impulse starter. It is a device which causes a standard magneto to produce a hot spark regardless of how slowly the motor is cranked. It is intended especially for heavy motors used on trucks, tractors, etc., though it may be employed on pleasure cars as well and can be attached to any model Eisemann magneto.

A hot spark regardless of cranking speed is produced by automatically compressing and releasing two springs which are part of the driving mechanism and which give the armature a sharp twist and thus cause the spark to occur at the proper moment. At speeds above 120 r. p. m. the device is automatically drawn out of action.

Fig. 1 shows the device when the motor is running, when it merely acts as a

coupling between the drive shaft and the armature. Fig. 2 shows the device when



EISEMANN MAGNETO WITH SIMPLEX STARTER FITTED

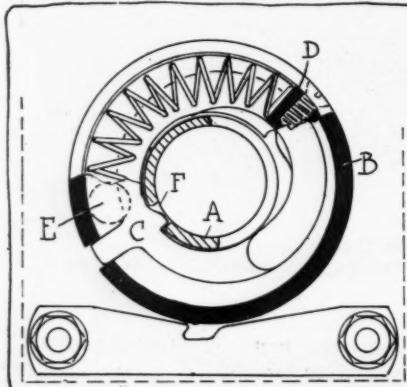


FIG. 1—IMPULSE STARTER WITH MOTOR RUNNING ACTING AS COUPLING ONLY

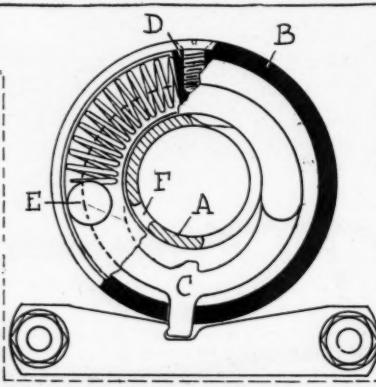


FIG. 2—IMPULSE STARTER WITH MOTOR STOPPED, READY FOR CRANKING

the motor is stopped and the crank handle has just been grasped.

Fig. 3 shows it just before the trigger lets go and the armature is snapped forward, producing the spark. The member A is driven from the timing gear; B is the part that drives the armature; C is a trigger which transmits the drive from A to B when the motor is running and drops in the notch in the cross bar by the action of gravity when the crank is slowly turned

Impulse springs are placed between the two blocks D which are fastened to the driven member B and the pins E which are part of the driving member A. Turning A in the direction of the arrow compresses the springs. When the crank is turned the trigger is moved around so that it drops into the notch in the cross bar by gravity and thus holds the driven member B temporarily against rotation.

Further movement of the crank handle compresses the springs and when the compression is complete the cam on the trigger comes into contact with the driving member A and pulls the trigger away from the notch in the cross bar, thus releasing the driven member and allowing it to fly in the direction of the arrow, Fig. 3, rotating the armature and producing the spark.

The trigger is heavily weighed on its upper half and as soon as it is rotated it tends to move inward still further so that when the driven member snaps in the direction of the arrow the trigger drops into the notch F in the driving member, Fig. 1. This feature allows the drive to be transmitted positively and removes the load from the springs. This connection is maintained until the speed drops below the minimum operating speed of the motor, at which time gravity becomes stronger than centrifugal force and allows the trigger point to come into contact with the notch again.

The construction throughout is heavy and substantial. The trigger is hardened steel and the springs bear against thin spring steel liners as shown in Fig. 1. All parts are fully enclosed and operate in grease. The device also incorporates, on its driving side, a standard Eisemann coupling which not only gives flexibility but also allows the magneto to be removed by lifting directly upward.

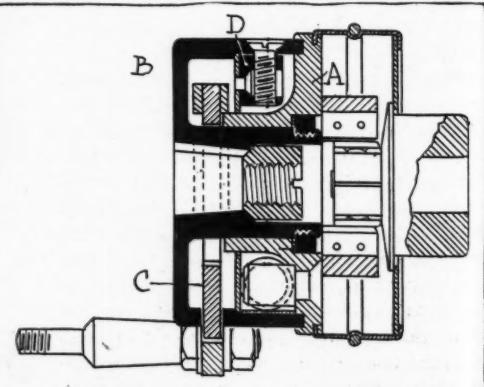


FIG. 3—SECTION OF IMPULSE STARTER JUST BEFORE TRIGGER LETS GO

# The Motor Car Repair Shop

## Polishing the Car—Parking Hints—Cleaning Processes

THE piano-like finish which is nowadays imparted to the surface of the motor car when it leaves the factory may be preserved for a much longer time than is usually the case, if proper care is taken in cleaning it. Much of its lustrous appearance or lack of lustre is due to the manner of polishing it from time to time. You would not think of letting a valuable piece of furniture go for a long period of time without applying a good furniture polish to it, and then rubbing it afterward.

The same thing can very wisely be done to the body of the car. There are a number of good polishes on the market which are intended not only for furniture polishing but for polishing the body of the car as well.

A recommended polish for the car is mixed as follows: Mix 1 pint of turpentine with an equal amount of wood alcohol. Then mix together 1 quart of pure water and 1 quart of paraffin oil. The latter two will not mix readily, and the best way is to put them in a gallon bottle and shake vigorously until the best possible union is obtained. This done, add the previously mixed alcohol and turpentine to the latter combination and shake the whole until thoroughly mixed.

Apply this polish with a soft flannel cloth, and rub the surface dry with another. The polish is apt to separate after standing, and it should be well shaken each time it is used.

### Periodic Cleaning Necessary

If an owner would have his car looking as well as his furniture, periodic cleaning and polishing is necessary. To expect a highly-polished car to keep its luster indefinitely after being used in all sorts of weather is asking the impossible. However, a reasonable amount of care by the car owner can do much toward keeping the body luster as nearly like that of a new car as possible.

The market, at present, affords numerous cleaners and polishers which are quite inexpensive and show remarkably good results. The paste or wax polishes, as they are called, are perhaps used to a greater extent than the liquids. The majority of the paste polishes use carnauba wax as a base. This wax is obtained from Brazil, where certain trees excrete a dark liquid from their leaves. This liquid is collected after it has hardened in air and is boiled. The wax rendered in the boiling process floats on the top of the mass and it is this wax which is used for making the polish. A great deal of this same wax is used for making paste shoe polish and everyone knows how bright and shiny a pair of shoes can be made to appear if they are

polished at frequent and regular intervals.

Why not take the same care with your car as you do with your shoes? Motorists have their shoes polished, perhaps, every day, perhaps only twice a week. Some might go so far as to leave shoe polishing alone. While a pair of shoes with unprotected leather may mean only a few dollars loss, a car body is worth considerably more and then, as with the shoes, the owner's shiftless methods are reflected if it is unpolished.

In applying paste polishes the mistake often is made in rubbing the paste directly onto the body. Much better results will be obtained if the polish is placed in a small cloth sack or in a pocket formed by a piece of cloth. Then by rubbing the sack or pocket against the body the polish will

would preserve its softness and keep it from cracking is a good leather dressing preparation—there are a number of good ones on the market. Water in which there is a little ammonia is a good leather cleaner and after using it a soft cloth should be employed to rub the surface of the leather dry.

### Diagonal Parking Dangers

It is interesting to note that one of the big repair shops in Detroit, where they have diagonal parking rules for the reason that curb space along the business streets is at a premium, finds a preponderance of repairs to the steering mechanism, mostly of an elementary nature with misalignment of the wheels as the most serious feature. It is easy to see why there should be so much of this misalignment, because the average motorist is careless in parking.

Just to prove his theory, the writer stood and watched a number of cars parked. Almost invariably the driver allows the wheel to bump against the curb in bringing the car to a stop. He makes the curb stop the machine instead of bringing it to a stop with the brake. This puts a strain on the wheel, which, with the weight of the car back of it, is apt to spring the steering connections. Repeated carelessness of this kind is apt to bend the steering cross rod or possibly the steering arms. Then, too, most drivers do not set the emergency brake when leaving the car standing with one wheel against the curb, the whole weight of the car pushing against that one wheel.

The diagram in Fig. 1 will illustrate what is meant by diagonal parking, and the abuses to the steering connections where one wheel is constantly receiving the parking strain of being banged against the curb will be at once quite apparent.

### Cleaning Radiators

Referring to the article in the repair-shop department of Motor Age in the August 19 issue, the McCord Mfg. Co., Detroit, Mich., radiator maker, states that hydrochloric acid should never be used in cleaning radiators. This acid will attack the zinc contained in the brass and cause leaks, it is claimed. Motor Age received the information for the story from a concern in Chicago which makes a business of cleaning and repairing radiators.

The McCord company states further that an air pressure of 20 pounds is too much for testing radiators and that 5 to 7 pounds is ample. It is stated that 20 pounds puts too severe a strain on the parts, which works to the disadvantage of the radiator.

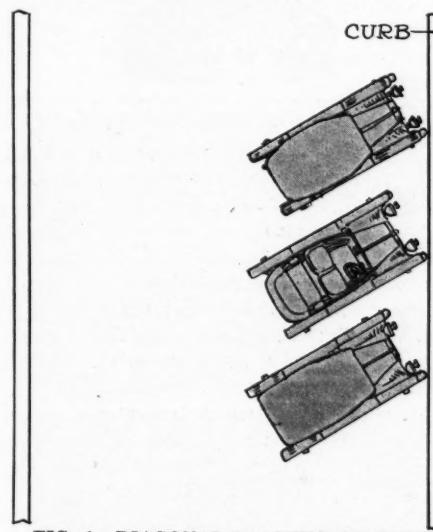


FIG. 1—DIAGONAL PARKING OF CARS

*This method makes for misalignment of wheels, though mostly due to carelessness of car operator*

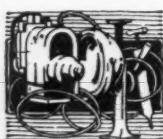
ooze out through the pores in the cloth and in this way the paste will be applied evenly all over the body surface.

The polishing cloth which is used after the paste has been applied really gives the body its polish, just as the bootblack's cloth gives the shoe leather its luster after the cleaning liquid has been thoroughly applied and the polishing paste has been well rubbed in.

In most body polishes there is a little turpentine which keeps the mass in the form of a paste and prevents it from hardening. Also there may be a little naphtha in the paste, this being used to cut the dirt.

### Cleaning Leather Upholstery

Leather upholstery does not take kindly to gasoline as a cleaning agent. The best thing to apply to the upholstery if you



# The Accessory Corner



## Evenlite for Fords

IN Ford cars using the magneto as a source of lighting current, there always is some difficulty experienced because of the change of illumination with engine speed. At low engine speeds the lights are dim, at high speeds they are bright. There have been offered a number of attachments to regulate the flow of current, so as to cause the lamps to burn with the same brightness, regardless of speed, and the most recent device of this sort is the Evenlite, announced by the St. Louis Electrical Works, St. Louis, Mo.

This accessory is in the form of a coil which is placed in the ignition system in series with the switch and lamps, as shown in the wiring diagram in Fig. 4. This installation automatically takes care of the current, feeding it uniformly at all speeds and reducing it to 6 volts.

The manufacturer has made a test of this system and the results are shown below, compared with those obtained from the regular Ford system.

At 7 miles per hour the Evenlite gives 5.3 times as much light as the Ford system; at 10 miles per hour, it is 3.1 times; at 15 miles per hour, it is 2.1 times; at 20 miles per hour, it is 1.3 times.

From the above test it is seen that there is a bright light from the Evenlite at 6 or 7 miles per hour. When the car reaches a speed of 22 miles per hour the light from both systems is approximately the same. As the speed of the engine increases beyond 22 miles per hour the Evenlite remains constant, while the present system will increase or decrease the light, accord-



FIG. 1—EVENLITE COIL FOR FORDS



FIG. 2—ABOVE, B & W PISTON RING; BELOW, ZEPHYR PISTON

ing to the speed at which the engine runs.

It is stated by the maker that the current consumption of the coil is exceedingly small. Installation may be made in about 15 minutes with ordinary tools. The reduction in voltage to 6 makes the use of 6-volt bulbs necessary and these are supplied with the coil, the price being \$3.50. The price without the bulbs is \$3.

## Singer Signal

A traffic signal which indicates whether a car is going to stop, turn, go slower or

circle is the Singer, announced by C. A. Singer, 1627 Washington avenue, St. Louis, Mo. The Singer signal indicates by means of the words, STOP, SLOW, CIRCLE, LEFT, RIGHT, these words being shown from a casing which is illuminated at night. Control is by a single button on the steering wheel or other convenient place, battery current being used for operation.

The Singer, shown in Fig. 3, uses two casings, one in front and the other in the rear of the car and these signals are both set automatically when the control button is depressed. If necessary, it can be arranged so that a horn or electric bell is operated simultaneously with the signal.

The Singer is contained in a black enameled box, 6 by 8 inches, and the letters are  $\frac{1}{2}$  inch high, in white on a black background. Installation is said to be a matter of 15 minutes.

## Little Giant Causeway

Another device for enabling car wheels to get traction when in mud or sand is the Little Giant Causeway, made by the Little Giant Causeway Co., Pontiac building, St. Louis, Mo. The Causeway is in the form of a series of wooden sticks with triangular end section, with those at one of the ends of smaller length and made of steel. This construction presents practically a corrugated surface to the wheels of the car and allows of traction being gained. The Causeway is shown in Fig. 5, and it is applied by placing the narrow end with the steel cross pieces under the spinning wheel, the latter carrying itself over on to the remainder of the rough surface.

## Haberstick Car Extractor

A neat and simple accessory for preventing wheel spinning when the car is in deep mud, sand, etc., has just been brought out by P. F. Haberstick, Wheeling, W. Va. This attachment is in the form of a small galvanized-iron box attached to the underside of the running board and from this box a canvas tape is drawn in such a way that it is automatically wrapped around the tire after being fastened at one end to a wheel spoke.

The Haberstick, shown in Fig. 6, uses a five-sided box, 3 inches deep,  $9\frac{1}{2}$  inches

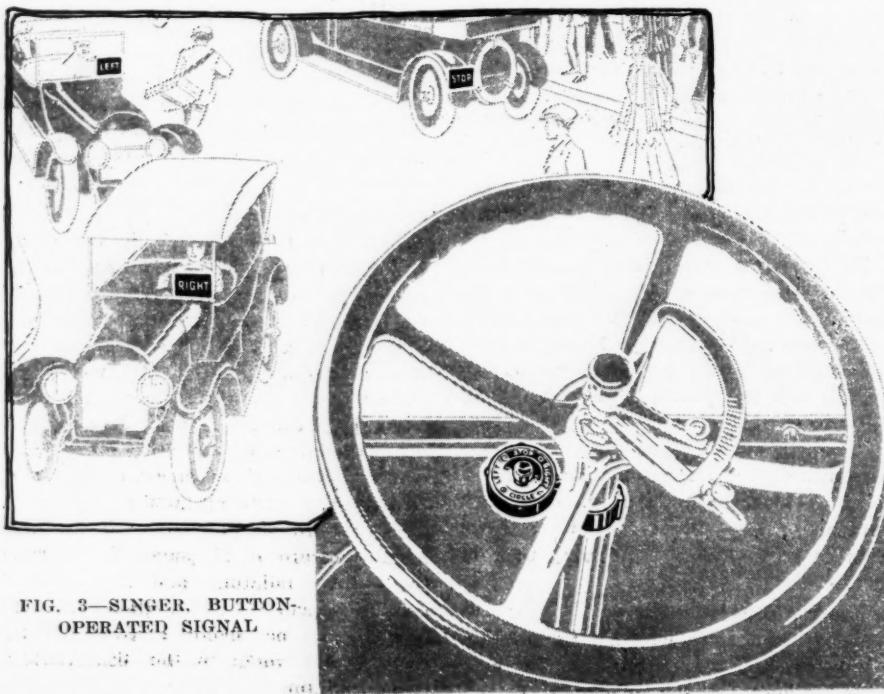


FIG. 3—SINGER, BUTTON-OPERATED SIGNAL

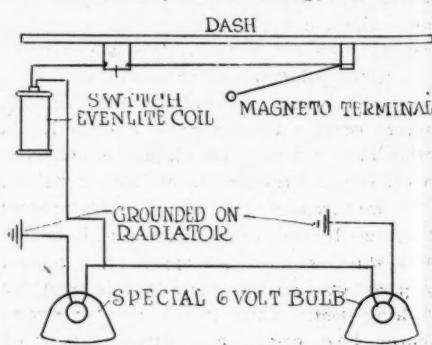


FIG. 4—WIRING OF EVENLITE FOR FORDS



wide and 12 inches long. Inside the box is a wound-up piece of canvas 30 feet long and 8 inches wide. There is a slot in the end of the box and through this slot the end of the canvas is drawn. It is attached to one of the spokes and the car then started. This causes the canvas to be wrapped around the tire and when the canvas has been withdrawn from the box, the ends of the strip may be fastened together. In order to present an uneven surface the canvas has transverse strips fastened along its whole length.

#### Zephyr Pistons

A lightweight piston of appearance unlike the conventional in that the regular skirt is not used is the Zephyr, marketed by the Wridgway Co., Wilkes-Barre, Pa. The Zephyr, instead of being of the same diameter throughout has a central portion smaller in diameter than top and bottom portions, making it spool-shaped, as shown in Fig. 2. The central part has the bosses integral and is drilled. The lower portion also is drilled and the upper is fitted with two rings. The numerous holes in the piston are used as oil drains. A special size is made for Ford cars.

#### B. & W. Piston Ring

The Ballman-Whitten Mfg. Co., 5407 Easton avenue, St. Louis, Mo., is marketing the B. & W. piston ring, which consists of two eccentric rings pinned in position, so that the joints are diametrically opposite, placing the thick section of one ring over the joint of the other, as shown in Fig. 2.

Leakage is prevented by using a scuffed joint, covered by the thick portion of one of the rings. It is stated that the pressure against the cylinder wall is uniform all around and that the ring fits the cylinder perfectly at every point.

#### Indigan Fan Belting

Hot water, oil and heat perhaps do more to shorten the life of the leather fan belt than anything else, and they are three things which act so detrimentally upon the

FIG. 5—LITTLE GIANT CAUSEWAY FOR EXTRACTING CARS FROM MUD



leather that any ordinarily-cured stock will not generally answer the exacting service requirements of fan drive.

Realizing these things, the National Leather Mfg. Co., belt maker at Niles, Mich., has brought out a special fan belt stock, and has even gone so far as to make a special campaign on belts adaptable particularly to the Ford engine. These are made to correct length and fit readily.

The new article is called Indigan fan belting, and is made from chrome grain

leather. It is claimed by the maker that from the time this leather is started from the green hide the idea is to produce a piece of material that will meet the conditions under which fan belts operate.

This concern also makes V-shaped fan belts, tire boots, laces for boots and hoods, crank pockets, metal hooks of various kinds, straps and round belting.

#### Art Metal Emblems

The two radiator emblems in Fig. 7 are made by the Art Metal Works, 7 Mulberry street, Newark, N. J., and are typical of their line. The one showing the policeman with a large white hand raised is 5 inches high and 2½ inches wide, is made of solid metal, enameled in colors. It is fitted with nut and washer on a threaded portion, so as to be attached easily.

The other emblem is called the America First and consists of two American flags, with the words America First between them. This is 3 inches high and 5½ inches wide and is finished in burnished gold or nickel, with enameled colors.

#### Camping Outfit for Motorists

The motorist-camper has received recognition by the United Steel & Wire Co., Battle Creek, Mich. This concern is marketing a special camp cooking outfit for the use of motor parties, the special features of which are the compactness with which the various utensils can be stowed away and the grid on which the pots and pans are arranged, with space below for charcoal or other fire.

The special camping outfit which should appeal particularly to motorists consists of one 8-quart aluminum cooking pot with cover, one 7-quart aluminum percolator coffee pot, one aluminum frying pan with detachable handle, one tin-plated steel meat broiler and toaster, and one tin-plated grid and charcoal grate. These things all fold and fit together so that they really take up a surprisingly small space when their bulk in unpacked condition is considered. In addition, special canvas cases are provided for carrying them. Price is \$7.50. See Fig. 8.

The United company also sells several styles and sizes of grids separate from the complete outfit.

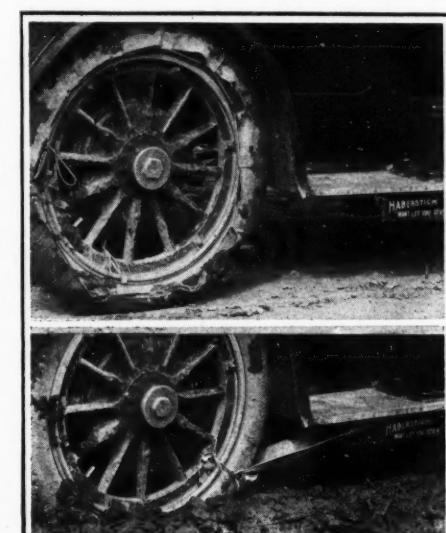


FIG. 6—HABERSTICK CAR EXTRACTOR



FIG. 7—ART METAL EMBLEMS



FIG. 8—UNITED CAMPING OUTFIT



A sign that should be heeded—

**PLEA to Motorists**—The Marietta Chamber of Commerce, Marietta, O., is working for a \$1,000 tax fund for improving the roads in the vicinity of that city. This civic body evidently is doing its best for the motorist, as evidenced by the illustrations above. Instead of calling the motorists' attention to the probable fine if the speed law is violated, the signs used should cause any fair-minded driver to heed the chamber's plea.

**Dealers Can't Lend Tags**—According to a ruling of the highway commission of Pennsylvania motor car dealers are forbidden to lend their license tags to purchasers of cars pending the arrival of the purchasers' tags.

**Oklahoma Has 32,000 Cars**—According to the latest figures the number of motor cars in Oklahoma has reached 32,000. The motor buying possibilities of the new state seem better than at any other time since its admission to the union.

**War Curtails Canadian Luxuries**—The war has curtailed Canada's importation of luxuries, especially in motor cars and carriages. In the last 12 months imports were \$7,420,000, compared with \$18,560,000 for the preceding 12-month period.

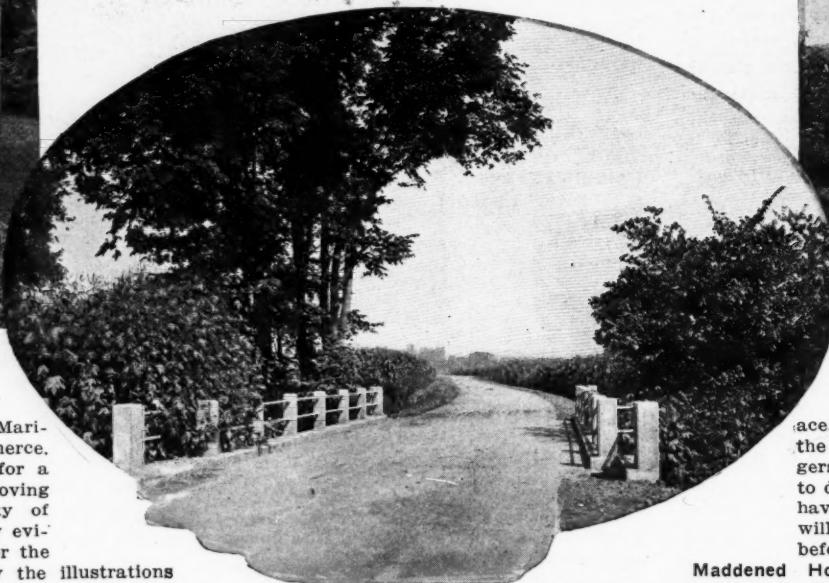
**Farmers Own 50 Per Cent of Cars**—It is estimated that 50 per cent of the 2,000,000 motor cars in use in the United States are owned by farmers and the percentage is increasing each year. It is estimated that 60 per cent of the 1915 output will go to the farming communities.

**Must Dim Headlights**—The District of Columbia commissioners have adopted an amendment to the police regulations granting permission to use electric or acetylene headlights or side lights on motor cars and motorcycles. The lights are to be allowed, however, only on condition that they are equipped with anti-dazzling devices approved by the chief of police.

**New Dimmer Ordinance Passed**—The city council of Springfield, Mo., has passed a new dimming ordinance, providing that the main shaft of light shall be confined to a minimum spread and that the uppermost rays shall not be more than 6 feet above the surface at a point 100 feet ahead, and the shaft shall be directly ahead of the vehicle. The penalty is \$1 to \$100 fine, or 5 to 60 days in jail, or both.

**Private Garage Stove Draft**—Chief George C. Neal of the Massachusetts state police has sent a letter to the owners of private garages asking them to rearrange the heating apparatus in their garages where they use stoves so that the draught to the stoves shall be supplied from outside the buildings.

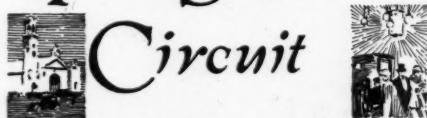
# From the Four Winds



Brick and concrete pike leading into Marietta, O.

He points out that gasoline vapors reach the fires when the stoves draw the air from within the building and this is a men-

## The Show Circuit



**San Diego Exposition Show**—A motor show is to be held in the Plaza de Panama in the Panama California Exposition grounds, October 15 and 16. The show is to be promoted and managed by the exposition officials. It is the plan of the promoters to make it one of the largest motor car shows ever held on the Pacific coast. There is room for the display of more than 100 cars in the Plaza de Panama.

**Denver, Colo. Show**—Eight motor car and accessory dealers already have contracted for space for the 2 weeks' fall show to be held in Denver, Colo., in connection with the International Soil Products Exposition, September 26 to October 10. Twelve more formally have applied for space but have not yet signed up, and another eight are counted upon if they are able to get the necessary shipment of cars.

**Rockford, Ill. Show**—Motor car dealers of Rockford, Ill., voted last week to conduct a reliability run for a distance of several hundred miles through Winnebago and contiguous counties on September 20 and 21, to conclude with a motor show at Rockford September 22 to 25. A committee was appointed to arrange the route and other details in connection with the run and also the show. This committee will report next week.

**St. Louis, Mo., Show**—Indications are that the ninth annual motor show of the St. Louis Automobile Manufacturers and Dealers' Association October 4 to 9 will be greater and more successful than any previous show held there. The event is attracting more or less of national attention in view of the fact that it will afford one of the first public exhibitions of 1916 cars.



—and the reward for doing so

ace. As he has power under the law to act against fire dangers he can compel the owners to do as he says, and those who have garages close to dwellings will be forced to make a change before cold weather begins.

**Maddened Horse Overturns Motor**—Apparently angered at the appearance of a motor car, or chagrined because the car passed it, a horse on the streets of Tecumseh, Mich., last week dashed up behind the car and attempted to climb into the back seat. In trying to extricate itself the horse overturned the motor car.

**Fuel from Sugar Waste**—Motor fuel from sugar waste is the latest proposition from England, the Royal Automobile Club having made tests of the new fuel, to which the name natalite has been given, from Natal, the country of its origin. The principal ingredient is alcohol obtained from the waste products of sugar refining factories.

**State Police After Motorists**—Motor car owners in Pennsylvania will find themselves under more strict surveillance than ever when Major John C. Groom, superintendent of the state police, complies with the request of the state highway commissioner, which he has promised to do, in detecting violation of the state motor laws. Major Groom is instructing his captains to have their men keep on the lookout for improperly displayed tags, cases of one tag only, and other violations.

**Wanted—A Sherlock**—Sheriff George Flesher, Bloomington, Ill., has received the following self explanatory letter: "I want to notify you to look out for a Ford car that was stole from me by Dale Hardy. He also stole my wife and baby. My wife has a small pointed wart on her nose, down on the point of it. She also humps her shoulder when she walks. He also took my wife's suit case which has a small hole punched in the side. There is a warrant out for his arrest. Notify Charles Crane, Blandinville, Ill."

**Experience a Great Teacher**—The experience of August German, who makes his habitat at Naperville, Ill., brings to mind the case of a man who bought a coach dog at auction, and afterward found that the spots were not rain-proof. He forgot to get an umbrella for the dog. Mr. German economized for 5 years, saved up over \$500, bought a Ford, toured to Chicago, left the car at the curb near Lincoln park and took his family to see the sights. Later in the day he discovered he had overlooked the purchase of an important accessory—he forgot to buy a lock.

**Male Portia and Female Shylock**—Since Evanston, Ill., does not deny the qualifying

adjective "classic," a recent case in that city's court, in re policewoman vs. chauffeur, properly may be likened to a case in another court, the story of which now is a classic. The modern "Merchant of Venice" characters were: Evanston's only policewoman, Shylock; a chauffeur, Antonio; the jury, a plural Portia. Shylock charged Antonio with taking her for a ride, embracing her and suggesting a cooling beverage. Portia weighs evidence and, besides losing the case Shylock learns from the jury that "Luring on a man flirt makes a woman culpable."

**Tells of Accessory Theft**—The detailed operations of a gang of motor car tire and accessory thieves whose extensive activities during the last 6 months had heretofore baffled the police at St. Louis, Mo., were divulged last week by Edward Jackson, a negro who was arrested while carrying two tires, inner tubes and detachable rims out of a private garage. Jackson gave the police the names of six men who he said first spotted an accessible garage and then came with a pushcart at night and removed all the tires and accessories available. He also gave the names of persons to whom the stolen goods were sold.

## Good Roads Activities

**Uncle Sam Building Postroads**—The government is building 465 miles of experimental post roads in thirteen states. These are being constructed with the \$500,000 appropriation voted in 1912 to test the value of improved rural carrier routes. The government pays one-third of the expense and the county in which the road work is done pays the balance.

**Concrete Highway Increase**—According to the report of the department of agriculture there are 19,200,000 square yards of concrete highways in the United States at present, compared with only 364,000 square yards in 1909. Durability, smooth surface, absence of dust and comparatively low cost of maintenance are responsible for their popularity.

**Montana Road Association**—Montana now has one good roads association instead of two, since the consolidation of the Montana Good Roads Association and the Montana Automobile Association at a convention held last week at Bozeman.

**Protests Pike's Condition**—The Lancaster Automobile Club, Lancaster, Pa., has filed a protest with the public service commission against the Lancaster and Marietta Turnpike Co., charging that it does not maintain its roadway as required by its charter and acts of the legislature.

**Roadbuilding in Tennessee**—When the work contemplated in eastern Tennessee is completed that section will have some of the best highways in the entire south. Practically every county in the eastern part of that state has issued special road bonds and much work is in progress.

**Civic Body Gives Road Drags**—A carload of split-log drags is being distributed through Washington where timber is scarce, by the Seattle Chamber of Commerce. These will be used to assist in maintaining the permanency of the transcontinental highway to the northwest.

**Georgian Circuit Opened**—Formal opening of the Georgian circuit, a motor highway of 500 miles, completely surrounding Puget Sound and the Gulf of Georgia, was celebrated at Port Angeles, Wash., recently. A. E. Todd, president of the Victoria Automobile Club, Victoria, B. C., and originator of the name "Georgian circuit," completed the ceremonies by formally declaring the road open.

**Killing the Goose**—The Aurora Automobile Club, which with the Chicago Motor Club and Ottawa motor car owners, laid out the Starved Rock trail, is considerably

exercised over an attempt of Sandwich citizens to change the route so that it will go via Sheridan instead of Somonauk to the park. If this attempt is persisted in the trail from Aurora will be changed to go through Big Rock and Little Rock, thus cutting out Sandwich and Plano. It is charged that the efforts to change the route was made to benefit some garage and refreshment stand proprietors.

**Will Plan New Highway**—Several hundred good roads boosters will meet at La Salle, Ill., September 16, to discuss a proposed highway between Chicago and Peoria, via Joliet and the Illinois river valley.

**Award Ohio Road Contracts**—The Ohio highway commission has awarded road contracts in more than a dozen counties in the Buckeye state aggregating \$600,000. In many cases the work is to be done this fall while others provide for construction work in the spring. The commissioners of Franklin county have awarded five large road contracts for the improvement of outlying roads. The contracts aggregate about \$160,000.

**Dixie Highway Indiana Marker**—The official marker for the Hoosier-Dixie highway has been agreed upon, the body to be a rich yellow. At the top in black letters

will be the word "Hoosier," and at the bottom "Dixie." In the center will be the letters "H" and "D" in monogram form. An arrow will indicate the turns. The marker was designed by S. F. Spohn, Goshen, Ind., who was chairman of the committee appointed for that purpose.

**Hoosier-Dixie Parade**—A motor car parade starting at Cincinnati, O., and ending at South Bend, Ind., with between 300 and 500 gaily decorated machines in line, was one of the forms of advertising adopted by the governors of the Hoosier-Dixie highway at a meeting held in Warsaw, Ind., last week. The plan met the hearty approval of the governors and it was decided immediately to begin arranging for the event which will be an innovation in roadbuilding propaganda.

**Unequal Road Fund Distribution**—Discovery that while Snohomish county, Washington pays into the permanent highway fund \$16,000 annually through motor car license fees it receives only \$2,000 in return, has caused the county auditor to attack the present distribution system. Every sixteenth person in Snohomish county owns a motor vehicle.

## With the Motor Clubs

**Club Passes 1,000 Mark**—The Automobile Club, New Haven, Conn., has passed the 1,000 mark in membership making it the largest club in New England, and the organization is going to celebrate the high mark soon with an outing of some sort.

**Columbus Club Marks Roads**—The Columbus Automobile Club, Columbus, O., is completing the work of sign-posting all of the roads within a radius of 35 miles of the Buckeye capital. The work was under the charge of H. K. Laird, general manager, and consisted in erecting both direction and danger signs; also posting boards every 3 miles along the road calling attention to the Columbus Automobile Club. Other clubs in central Ohio will take up the work where the Columbus club left off.

**Club Gives Service**—The Baltimore Auto Club has been incorporated and is giving Baltimore motorists yearly service for \$10. By joining the organization motorists will have to pay but \$10 a year for service which now costs many of them much more. The club will provide its members with free towing, accident, stolen car, expert mechanic, attorney, touring, theater, information and long-distance service.

**Clubs to Mark Highway**—The Rotary Club, Galesburg, Ill., has decided to co-operate with the Rotary Club at Rock Island, in marking a trail between the two cities. Committees have been authorized to select the best and shortest route between the two points. The marking, on telephone poles, will consist of yellow and blue bands. On the side of the poles facing Galesburg, the letter "G" will be painted; on the sides facing Rock Island, the letters "R. I."

**Club Reports Lincoln Traffic**—That the construction of the Lincoln highway has established an increasing traffic over that road, is indicated by a report compiled by the Northern Indiana Motor Club, showing that in 6 months, 35,000 cars from outside points, passed through La Porte, Ind., while it was estimated that these tourists spent \$500,000 in that city.

**Club Appoints Patrolmen**—The Automobile Club of St. Louis, Mo., is planning to employ a special motorcycle officer who will be appointed deputy constable, to patrol the roads of St. Louis county in search of joy-riders. This action of the club resulted from the numerous complaints of members that travel over the county roads has become extremely dangerous owing to the increasing number of reckless drivers.

## Coming Motor Events

### CONTESTS

September 3—Track meet, Arden, Pa.  
 September 4—Track meet, Youngstown, O.  
 \*September 4—Speedway races, Minneapolis, Minn.  
 September 8-11—Track meet, Hamline, Minn.  
 September 11—Track meet, Burlington, Ia.  
 September 11—Track meet, Erie, Pa.  
 September 14—Track meet, Punxsutawney, Pa.  
 September 18—Track meet, Butler, Pa.  
 \*September 18—Speedway races, Providence, R. I.  
 September 24-25—Track meet, Grand Rapids, Mich.  
 October 1-2—Track meet, Trenton, N. J.  
 \*October 2—Speedway races, New York.  
 \*October 2—100-mile track races, Fresno, Cal.  
 October 9—100-mile invitation race, Indianapolis, Ind.  
 October 9—100-mile track race, Mattoon, Ill.  
 October 16—Speedway races, Chicago.  
 November 15-20—El Paso-Phoenix road race.  
 November 20—Road race, Corona, Cal.

\*Sanctioned by A. A. A.

### SHOWS

September 6-10—Wheeling, W. Va., show.  
 September 6-10—Indianapolis, Ind., show.  
 September 6-15—Detroit, Mich., show.  
 September 13-17—Milwaukee, Wis., show.  
 September 18-25—Los Angeles, Cal., show.  
 September 22-25—Rockford, Ill., show.  
 September 26—October 10—Denver, Colo., show.  
 October 2-9—Cincinnati, O., show.  
 October 4-9—St. Louis, Mo., show.  
 October 15-16—San Diego Exposition show.  
 October 6-16—New York, electrical show.  
 October 16-22—Montreal show.  
 November 1-3—Pasadena, Cal., show.  
 January 1-8—New York show.  
 January 22-29—Chicago show.  
 January 29—February 5—Minneapolis show.  
 March 4-11—Boston show.

### CONVENTIONS

September 20-25—International Engineering Congress.  
 September 24—Indianapolis, Ind., S. A. E. meeting.  
 October 4-6—Columbus, O., Garage Owners' Convention.  
 October 14—Chicago, S. A. E. Standards Committee meeting.  
 October 17-18—Cleveland, O., Electric Vehicle Association of America.



# Among the Makers and Dealers



**O**VERLAND DOES HEAVY FARM WORK—After driving a 1912 Overland touring car more than 20,000 miles over the rough roads of Saskatchewan, A. W. Bell, a native of Saskatoon, conceived the idea of putting it to work on his farm, with the above result. The car was converted into a tractor by putting on an extra axle under the frame, 2 feet in front of the rear axle of the car, on which were placed two reaper wheels. Removing the wheels of the car, sprocket wheels were put in their place and drive taken through a chain to the sprocket on the reaper wheels. This reduced the speed of the car and gave it more power. Since the change was made the car has done the work of eight horses.

**R**USH Delivery Leases Factory—The Rush Delivery Car Co., Inc., Philadelphia, Pa., has leased a four-story building for the manufacture of commercial vehicles.

**Detroit Trailer Occupies New Home**—The Detroit Trailer Co., Inc., has moved into its new factory in the motor section of Detroit where it will make about thirty trailers a day.

**Dodge Dealer Leases Building**—The Henshaw Motor Co., Boston, Mass., distributor of Dodge cars in eastern Massachusetts, has leased a large fire-proof building having 30,000 square feet of floor space.

**Studebaker Man Joins Chalmers**—Frank H. Smith, formerly with the Studebaker Corp., and later northwest district manager for the Hudson, has joined the sales force of the Chalmers in the capacity of special representative.

**Remittance Lost on Arabic**—Twenty thousand dollars sent to this country by Bell, Johnson & Co., Birmingham, England, to apply on the purchase of Detroiters cars, went down on the Arabic, according to advices received by the Detroit Motor Car Co., Detroit, Mich.

**Lewis Case Milwaukee Manager**—P. A. Lewis has been appointed manager of the Milwaukee branch of the J. I. Case T. M. Co., Racine, Wis., which devotes practically all of its attention to the sale of and service on Case cars. Mr. Lewis was formerly associated with the Case branch at Madison, Wis.

**Beardsley Electric Moves Plant**—The Beardsley Electric Co., Los Angeles, Cal., maker of the Beardsley electric, has broken ground for the first of a number of new buildings for its plant at Culver City. For several years the Beardsley maker has been located in the business center of Los Angeles but the plant outgrew the location and the move to Culver City was the solution of the problem.

**Build Factory or Forfeit Land**—Unearned increment, or the natural rise in real estate values, forms an important part in the decision of a Detroit court, which holds that 30 acres of land sold to the Maxwell Motor Co. and the Flanders Motor Car Co., in Highland Park, Detroit, 5 years ago, must have factory buildings started on it within 90 days or the motor companies forfeit their

rights to the property. The tract was purchased for \$28,000 and now is valued at nearly \$400,000. It is said to have been sold at cost, the buyers agreeing to improve it.

**Watson Haynes Sales Manager**—D. L. Watson has been appointed general sales manager for the Haynes Automobile Co., Kokomo, Ind., to succeed R. Crawford.

**Standard Welding Factory Manager**—R. S. Bryant, who has been consulting engineer for the Standard Welding Co., Cleveland, O., has been appointed factory manager for the same concern.

**Touraine Company Adds**—The Touraine Co., Philadelphia, Pa., maker of the Vim delivery truck, has plans prepared for a factory addition, 95 by 250 feet. The new structure will be four stories high.

**Maxwell Heir to New Duty**—The Maxwell Motor Co., Detroit, Mich., finds itself heir to a strange duty—that of furnishing radiators, fenders and many other pressed-metal parts to a number of rival manufacturers. This comes about from the combinations and changes in ownership of various plants, with some of whom the Maxwell company held long-term contracts. A case in point is that of the old Briscoe plant, bought by the Maxwell concern. The Briscoe organization numbered among its radiator cus-

tomers manufacturers of seventy-eight cars made in this country.

**Scripps-Booth Building Factory**—Ground has been purchased and work now is going forward on a three-story, fireproof factory for the Scripps-Booth Co., Detroit, Mich.

**Bamford Detroiter Production Manager**—W. R. Bamford, formerly with the production end of the Chalmers, Hupmobile and Oldsmobile, has been made production manager of the Detroiter.

**Rutener Motor Increases Plant**—Four new buildings are being added to the plant of the Rutener Motor Co., Marion, Ind., which will increase this concern's floor space 25,000 square feet, or about 25 per cent.

**Motor Company Making Ammunition**—The Russell Motor Car Co., Toronto, Ont., has begun the manufacture of shells for the British army. It has contracts that will require the plant to work to capacity for the remainder of the year.

**Overland Shipments Steadily Increase**—Shipments of the Willys-Overland Co., Toledo, O., have shattered practically every existing record previously established by this company. The production facilities of the plant have been steadily increased, until now the shipments of a single day amount to more than the yearly output of Overland cars 8 years ago. Less than 2 months ago the average daily shipments reached the 400 mark. August 26, 502 cars were shipped. The average now is hovering around the 500 point.

**Industrial Trucks for Canal**—For the terminal piers at the Panama canal in Cristobal, four electric industrial tractor-trucks have been purchased by the Panama Railroad Co. of the Buda Co., Chicago. These four are but the forerunners of large installations that will be made upon the approval of the work of the first four. Each of the four is equipped with three trailers by which it is able to haul great tonnages. Eight more electric stevedores are to be purchased by the New York agent for the Panama railroad, these to be of the crane type, which will be able to dispense even with the small amount of human labor necessary to load and unload the electric industrial trucks.

**Racine Tire Opens Branch**—The Racine Auto Tire Co., Racine, Wis., manufacturing the Racine horseshoe tire and other rubber goods, has established a branch depot and distributing station at Milwaukee, Wis.



**M**AXWELL MARY GETS A BATH—Mountain, desert, gumbo and city pavement were all alike to Maxwell Mary during her service with the Maxwell racing team. She was the maid-of-all-work, carried the drivers and mechanicians to and from hotels and the tracks. With a trailer she pulled tools, spare wheels and other racing paraphernalia. Just before the Maxwell team disbanded, to show their appreciation of Mary's service, during which she had never voiced a jealous word over the attention lavished on the racing cars, but denied to her, they gave her the first bath she had seen in months. The mud and dust of nine states was removed, the drivers styling the work a labor of love.

W. M. Smith, of Milwaukee, has been appointed manager. The branch will handle all Wisconsin business.

**Marketing Portable Jack**—The Alben Co., Milwaukee, Wis., is marketing a new portable jack and crane for use in garages. The combination instrument lifts any car up to 5,000 pounds to a height of 9 feet and weighs only 300 pounds.

**Makes One Tire of Two**—The Unified Tread Co., St. Louis, has patented a new method of joining two old casings so as to make one good one therefrom. The bead is cut from the outer casings and the two are then riveted together on the edge. The rivets are staggered.

**Polhamus Resigns from Bowser**—A. Z. Polhamus, chairman of the executive board of the S. F. Bowser Co., Fort Wayne, Ind., has resigned from that position after serving the company in various capacities for 25 years. He will retain his financial interest in the company.

**Chandler Motor Adds**—The Chandler Motor Car Co., Cleveland, O., will enlarge its plant by the erection of a one-story steel and concrete building, 120 by 400 feet, a one-story concrete building, 60 by 200 feet, designed to permit the addition of three more stories, a boiler house, 50 by 60 feet, and the addition of a second story to the office building, 40 by 120 feet.

**Succeeds Simon Bros. Co.**—Russell H. Clark & Co. has succeeded to the business of the Simon Bros. Mfg. Co., Kansas City, Mo. R. H. Clark for several years was manager for the Simon company, which made tops and handled small repairs. The new company probably will add more extensive repair equipment later, including the equipment necessary to do work in metals and on machinery, most of the present work being in wood.

**Studebaker Ships Two Trainloads Daily**—The Studebaker Corp., Detroit, Mich., is shipping two trainloads of cars daily to its

**Akron, O.**—McCrea Auto Service and Supply Co.; to operate a garage and deal in accessories; capital stock \$5,000; incorporators, George McCrea, Emma A. McCrea, George E. McCrea and L. J. Myers.

**Amarillo, Tex.**—Overland Texas Co.; capital stock \$10,000; incorporators, T. S. Likins, T. F. Turner and A. S. Rollin.

**Ashtabula, O.**—Ashtabula Auto Sales Co.; to deal in motor cars; capital stock \$4,000; incorporators, G. A. Brockway, G. M. Parker, W. H. Collander, J. C. Moran and M. C. Callender.

**Austin, Tex.**—Thomson Motor Car Co.; capital stock \$15,000; incorporators, G. A. Half, E. J. Lanham and R. M. Thomson.

**Boston, Mass.**—New England Radiator Co.; capital stock \$25,000; incorporators, William W. Phillips, C. G. Kellogg, M. I. Kellogg.

**Buffalo, N. Y.**—Transmission Ball Bearing Co.; motor trucks, etc.; capital stock \$100,000; incorporators, J. P. Beatty, W. J. Murray, W. Morse Wilson.

**Canton, O.**—Auto Garage and Sales Co.; to operate a garage and sales agency; capital stock \$10,000; incorporators, J. H. Reese, F. C. Scheffler, F. M. Schweitzer, A. E. Hurst and E. J. Reeder.

**Cedarburg, Wis.**—Automatic Jack Co.; to manufacture lifting jacks and other devices and appliances; capital stock \$25,000; incorporators, J. R. Thill, E. J. Groth and M. N. Green.

**Chicago**—L. M. S. Motor Co.; to manufacture motors and motor cars; capital stock \$50,000.

**Cleveland, O.**—Hudson Styvesant Motor Co.; capital stock \$25,000.

**Columbus, O.**—Columbus Cadillac Co.; to deal in motor cars and accessories; capital stock \$25,000; incorporators, Morton McGiffin, Frank E. Felton, T. B. Bolton, E. S. Jenkins and R. G. Morrison.

**Dallas, Tex.**—Dallas Hupmobile Co.; capital stock \$6,000; incorporators, F. A. Wynne, W. R. Wynne, E. O. Thackston.

**Dover, Del.**—Automobile Owners Supply Co.; to manufacture motor cars, etc., and accessories; capital stock \$100,000.

**East Orange, N. J.**—Prospect Garage; general motor car business; capital stock \$50,000.

**Elkhart, Ind.**—Indiana Auto Sales Co.; to buy and sell motor cars and to conduct a repair shop; incorporators, H. L. Simonton, H. H. Albert and E. J. Engstrom.

**Enid, Okla.**—Overland Service Corp.; capital stock \$5,000; incorporators, T. F. DeBruler, B. L. Sadding and Guy S. Mannatt.

**Everett, Wash.**—Northwest Tire Co.; capital stock \$2,000; incorporators, Arthur A. Bailey, James C. Lashna.

**Fort Wayne, Ind.**—Fuhrman Auto Co.; to buy, sell and repair motor cars, gasoline tractors, motor car parts and accessories; capital stock

branches for distribution to dealers. This practice will be continued until all branch houses have received their full quota of cars.

**Coghlan Joins Moon**—Raymond G. Coghlan, eastern sales manager of the Lovell-McConnell Mfg. Co., maker of Klaxon horns, has resigned to become district manager of the Moon Motor Car Co. of New York, of which his brother, William J. Coghlan, is president.

**New Baltimore Winton Branch**—The Baltimore, Md., branch of the Winton Co. will occupy new quarters in the near future. A large building now is being constructed. When completed the entire building will be without posts, giving a clear span of 750 by 60 feet.

**Ford Adds at St. Louis**—The Ford Motor Co. will begin within the next two weeks the erection of a \$250,000 addition to its St. Louis assembling plant which will be an exact replica of the present building, it was announced here today by Warren C. Anderson, local manager. When the annex is completed the working force will be increased from 400 men to between 600 and 800.

**Packard at Manchester**—Alvan T. Fuller, who has the agency for the Packard line at Boston, Mass., Portland, Me., and Providence, R. I., has added Manchester, N. H., to his list, having opened an agency there last week. As Mr. Fuller went there personally to arrange for the opening that action dispels the rumor that he had sold out to the Packard Motor Car Co., of Detroit, to whom he recently sold his big service station in Boston.

**Moves to New Quarters**—The Henshaw Motor Car Co., Boston, Mass. agent for Dodge cars, has leased a building that was built especially for the E. R. Thomas Co. when it opened a branch at Boston with Mr. Henshaw in charge. It was later occupied by the Garford agents, but for some months has been idle. Mr. Henshaw will

utilize the entire building, but will also continue his service station at the Motor Mart.

**Electric Distributer Changes Name**—The Rauch & Lang St. Louis Co. has changed its name to Leach-Brouster & Co.

**Dodge in Worcester**—C. S. Henshaw, who has the Dodge agency in eastern Massachusetts with headquarters at Boston, has been given the agency for the car at Worcester so that now he controls about a third of the state. Simeon E. Baker is in charge.

**Chevrolet Adds Motor Plant**—The Chevrolet Motor Co., Flint, Mich., has broken ground for the erection of a plant which will be used to manufacture motors exclusively. It has also acquired stock control of the Mason Motor Co., and will operate its factory in connection with the new plant.

**Ware Now Twin City**—The Twin City Four-Wheel Drive Co. has bought the patents of J. L. Ware on the four-wheel-driven motor truck of that name which has been manufactured at St. Paul, Minn., for several years. The new company has a capital of \$500,000. A three-story office and factory building is to be erected at once.

**Has Entire State Agency**—Joseph W. Gogarn, who was recently given the agency for the Mitchell line at New Haven, Conn., has been made agent for the entire state as a distributor for the Carl H. Page Motors Co., of New York. F. D. Stidham, well known in New York motor circles, has joined the company as a salesman.

**Makes New Tires from Old**—The Two-In-One Tire Co. has opened a shop and office at Louisville, Ky. As the name implies, this concern takes two old casings, cleans off the rough places, cements the two together, sews two or three rows of stitches around the edge, and turns out a tire which, it is claimed, is good for 2,500 miles.

**New York**—Elite Stable's; motor car livery; capital stock \$4,000; incorporators, Antonio Quittazzi, Henry Pizzutello, Nicola Belluscio.

**New York**—Excelsior Garage; capital stock \$2,000; incorporators, Elias Hirschfield, Harry Thal and Mamie Thal.

**New York**—Knickerbocker Motor Service Co.; motor cars; capital stock \$1,500; incorporators, Louis Devantoy, Arthur H. Schnier, Miriam W. Kittel.

**New York**—National Combination Keyless Lock Co.; to manufacture, sell and deal in combination keyless locks for motor cars; capital stock \$200,000; incorporators, Charles Gibbs, M. E. Jacobs, Reuben Cohen.

**New York**—Sterling Automobile Mfg. Co.; motor cars; capital stock \$100,000; incorporators, Charles Chambers, William Adelson, Adolph Hayman.

**New York**—Turner-Sapienza Corp.; repairing, painting motor cars, machine shop, garage; capital stock \$5,000; incorporators, F. L. Pruhn, R. W. Turner, J. Sapienza.

**Oklahoma City, Okla.**—Parker Automobile Sales Co.; capital stock \$3,000; incorporators, J. E. Parker, A. L. Fowler, H. O. Weller and G. A. Young.

**Olympia, Wash.**—Capital Transit & Repair Co.; capital stock \$2,000; incorporators, L. J. Meyers, Henry H. Schultz, Otto A. Schultz.

**Philadelphia, Pa.**—Eastern Motors Corp.; to manufacture motor cars; capital stock \$150,000.

**Philadelphia, Pa.**—Philadelphia Motor Tire Co.; to buy, sell and deal in motor car tires and accessories.

**Pittsburgh, Pa.**—Auto Owners Service Assn.; capital stock \$10,000; incorporators, J. A. Williams, Leon Isaacs and A. Isaacs.

**Seattle, Wash.**—Newton Foster Co.; capital stock \$10,000; motor car dealers; incorporators, Dr. C. W. NePage, V. S. McKenna, Newton H. Foster.

**South Bend, Ind.**—Zeglen Tire & Fabric Co.; capital stock \$50,000; incorporators, Casimer Zeglen, F. L. Hardy and Dr. E. R. Deen.

**Spokane, Wash.**—Spokane Motor Transportation Co.; capital stock \$6,000; incorporators, Paul Quackenbush, Ralph Quackenbush and Ralph Quackenbush.

**Spokane, Wash.**—Inland Automobile Assn.; incorporators, T. S. Lane, F. W. Guilbert, Herbert Weatherspoon.

**San Antonio, Tex.**—Blumberg Motor Mfg. Co.; capital stock \$25,000; incorporators, R. G. Blumberg, H. D. Hierholzer, Joseph Hierholzer and Robert Butler.

**St. Clairsville, O.**—St. Clairsville Garage Co.; capital stock \$20,000; incorporators, John F. Anderson and others.

**Westport, Conn.**—Westport Garage; capital stock \$10,000; incorporators, Leonard C. MacKenzie, Florence MacKenzie and Grenville MacKenzie.

## Recent Incorporations

divided into one hundred shares at \$100; incorporators, William J. Fuhrman, George DeWald and Clifford Beall.

**Frederick, Md.**—Mountain City Garage Co.; capital stock \$25,000.

**Hudson, Mass.**—Hudson Garage Co.; capital stock \$5,000; incorporators, R. A. Carleton, Harry E. Dillingham and H. G. Carleton.

**Indianapolis, Ind.**—I. I. Motor Racing Assn.; motor racing; capital stock \$500; incorporators, H. B. Coats, C. T. Slusser, E. E. Coats.

**Jamestown, N. Y.**—Washington Street Garage; capital stock \$10,000; incorporators, Joseph L. Frick, Ellan A. Frick, Frank F. Peterson.

**Jersey City, N. J.**—Baldwin Garage; to conduct a garage and deal in motor cars; capital stock \$125,000.

**Kelowna, B. C., Can.**—Burbank Motor Co.; to manufacture motor cars; capital stock \$1,500.

**Lake Charles, La.**—Lake Charles Auto Supply Co.; capital stock \$10,000; incorporators, Dr. C. W. Hamilton and Theodore Drank.

**Medford, Wis.**—Medford Automobile Club; non-stock corporation; incorporators, Oscar N. Nystrum, Charles F. Leupke, E. C. Nystrum, W. H. Newburg and H. M. Kochler.

**Middletown, Conn.**—Middlesex Automobile Co.; capital stock \$10,000; incorporators, Earle W. Bennett, Harriet I. Bennett and Alice M. Quinn.

**Milwaukee, Wis.**—Teutonia Avenue Garage Co.; to operate a garage; capital stock \$3,000; incorporators, August F. Schunk, Arthur C. Milbrath and Fred R. Wahl.

**Milwaukee, Wis.**—Leo Hofmeister Co.; to deal in oils, greases, etc.; capital stock \$10,000; incorporators, Leo Hofmeister, C. M. Waechter and H. S. Kaczynska.

**Milwaukee, Wis.**—Oil Gas Machine Co.; to manufacture gas and gas producer engines; capital stock \$25,000; incorporators, Frank J. Blu, Harry M. Wink and Ernest O. Linton.

**Naugatuck, Conn.**—Connecticut Auto Co.; capital stock \$50,000; incorporators, James S. Taylor, Ida E. Taylor and Clayton F. Davis.

## New Garages, Repair Shops and Service Stations

Town	ILLINOIS	Firm	Supplies	Town	Firm	Supplies	Town	Firm	Supplies	
Havana.....	Franklin Harsman & Lloyd			Baltimore.....	C. E. Blaylock.....	Tires	El Paso.....	Modern Auto Co. ....	Repairs	
	Coppel.....	Repairs		Baltimore.....	A. P. Moesslinger.....	Tires	Temple.....	H. B. Conlisk.....	Garage	
Jacksonville.....	Howard Zahn.....	Garage		Baltimore.....	Standard Garage.....	Garage			WEST VIRGINIA	
Pekin.....	Edds & Joeger.....	Repairs		Frederick.....	Mountain City Garage Co.	Garage	Clarksburg.....	F. & W. Gaylord.....	Garage	
	INDIANA				MINNESOTA				WISCONSIN	
Indianapolis.....	Varney Electric Co. ....	Tires		St. Paul.....	Martin Motor Sales Co. Service		Eagle.....	Smart Bros. ....	Garage	
	KENTUCKY				NEW YORK			Kaukauna.....	William Van Lieshout.....	Garage
Louisville.....	National Auto Sales Co.			Hempstead.....	Park Garage.....	Garage	Oconto.....	Bradley Garage & Machine		
		Accessories			OHIO				Shop.....	Repairs
Louisville.....	R. A. Thornton Auto Co.			Ashtabula.....	L. W. Mann.....	Garage			FOREIGN	
		Repairs			TEXAS					
	MARYLAND			Dallas.....	Waco Double Tread Tire Co.		Vancouver, B. C. ....	Begg Motor Co. ....	Tires	
Baltimore.....	A & H Garage.....	Repairs								

## Recent Agencies Appointed by Motor Car Manufacturers

## **PASSENGER CARS**

## COMMERCIAL CARS

Town	Arizona	Agent	Make	Town	Agent	Make	Town	Firm	Make
Phoenix	C. L. Fauber	Vim		Boston	D. C. Tiffany Co.	Ward	Portland	Gerlinger Motor Car Co.	Vim
San Francisco	A. B. Costigan	Vim		Fall River	David M. Connell Co.	Vim		PENNSYLVANIA	
Harford	Keney Garage	Vim		Lowell	First Street Garage	Vim	Allentown	Krausse Auto Co.	Vim
	ILLINOIS			Worcester	F. S. Howard Motor Car Co.	Vim	Ardmore	Keystone Garage	Vim
Beckford	H. A. Gabel	Vim					Chambersburg	W. L. Forney	Vim
Indianapolis	Indianapolis Auto Sales Co.	Vim		MINNESOTA			Chester	Gallagher Bros.	Vim
Michigan City	Haviland Transfer & Storage Co.	Vim		Minneapolis	Hennepin Truck Sales Garage	Vim	Easton	Keytelle Motor Corp.	Vim
South Bend	William Devall	Vim		MISSOURI			Hazleton	John Deach	Vim
Terre Haute	Louis F. Hayes	Vim		St. Joseph	Howard Auto Co.	Vim	Pottstown	High & Trout	Vim
Louisville	KENTUCKY			St. Louis	Best Service Truck Co.	Gramm	Shamokin	Joseph Davenport	Vim
Baltimore	Strub's Garage	Denby		St. Louis	Denby Missouri Co.	Denby	Wilkes Barre	Erb & Zaring	Vim
Baltimore	MARYLAND			NEW JERSEY				Johnson Motor Car Co.	Vim
Baltimore	Larush & Seuffert	Vim		Atlantic City	Eastern Motor Co.	Vim		TENNESSEE	
Baltimore	Auto Truck & Service Co.	Denby		Camden	Oscar A. Eastlick	Vim	Memphis	John C. Dix Son & Co.	Wichita
				Millville	Boyd Henderson	Vim	Nashville	Imperial Motor Car Co.	Vim
				OHIO				TEXAS	
				Toledo	Cornelline Auto Co.	Vim	Dallas	William T. Fulton Co.	Vim
				OREGON			Seattle	WASHINGTON	
				Portland	Pacific Coast Wichita Truck Co.	Wichita		Pacific Coast Wichita Truck Co.	Wichita

# Every Time I Wash My Car IT RAINS!

This often seems the case. But if you use **Johnson's Prepared Wax** to polish your car, the weather doesn't matter. Rain slips off without even dulling the hard, dry finish. Spattered mud brushes away without leaving a freckle.

## Rain and Mud Won't Bother If You Use **JOHNSON'S PREPARED WAX**

The safe polish containing no acid to injure the finish, make it sticky or a dust-catcher. Acts as a buffer between the finish of your car and the elements.

### *Does Not Gather Dust*

**Johnson's Prepared Wax** polishes and finishes in one operation. Gives a hard, dry, glasslike coat that can not gather dust. Covers up mars and scratches. Protects the varnish and prevents checking. Mud and oil stains can easily be removed from cars polished with **Johnson's Prepared Wax**. Livens upholstery. Makes the wind shield clear-vision. Clean and easy to use and inexpensive.

### *Makes a Wash Last Four Weeks*

**Johnson's Prepared Wax** is a boon to the man who takes care of his own car. The tiresome task of washing is reduced to the minimum. One user writes us "It makes a wash last four weeks instead of one." An occasional application will keep your car like new, increase its market value, and give you the prestige that follows the appearance of prosperity and class.



Send 60c for 1 pint by Parcel Post, prepaid—enough for a season's use—or mail coupon for a trial can—sufficient for one polish on a large car.



**S. C. JOHNSON & SON**  
RACINE, WISCONSIN

MA9

**S. C. JOHNSON & SON, Racine, Wis.**

I enclose 10c for a can of **Johnson's Prepared Wax** sufficient for one polish on a large car.

Name.....

Address.....

City and State.....

My Accessory Dealer is.....

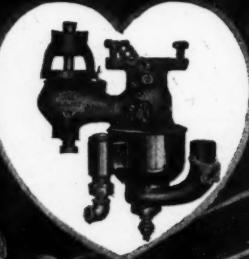
# SCHEBLER AT THE FRONT

On the firing line—  
Where dependability holds in the balance the lives of  
thousands—  
Where arrivals and departures are timed to the second—  
Where success alone is tolerated—  
Armored cars and relief ambulances are equipped with de-  
pendable SCHEBLER—

## *The Universal Carburetor*

SCHEBLER gives war-time service on pleasure, commercial and racing  
cars, at home.  
To insure every-day consistent service from your own car—demand  
SCHEBLER.

Wheeler & Schebler  
Indianapolis :: Indiana





# "Van"

The Speed-  
meter with  
the Big  
Black Figures

Ford cars for 1916 will be the same sturdy little rascals—hard as nails from stem to stern. For good and sufficient reasons, however, they will not be equipped with speedometers.

Van for Ford cars—at \$12—the speedmeter "Built Like A Watch By Watchmakers"—is especially designed to meet the requirements of that old Ford of yours, or of the new one you are going to buy. Remember that Van tells speed and distance as unerringly as an Elgin Watch tells time.

Van has adopted the standard type of front wheel drive, supplied by the Ford Motor Co., on all 1915 Fords, including a heavy armored casing. See illustration next week.

## THE VAN SICKLEN COMPANY

GENERAL OFFICES:  
14 Chicago St., Elgin, Ill.

FACTORY:  
Elgin National Watch Co.

Factory Representatives: Cutting, Armstrong & Smith Sales Co., Detroit, Mich., for the States of Michigan, Ohio and Indiana

General Distributors: The Beckley-Ralston Company, Chicago

Eastern Distributors: A. J. Picard & Co., 1722 Broadway, New York City

Foreign Distributors: Mestre & Blatge, 20 Store St., Tottenham Ct. Rd. W. C., London, England

Bracket  
Type  
for  
FORDS

\$12



# Don't Guess!

Don't abuse your storage battery. To either under-charge it or overcharge it will result in the ruin of the plates. Play safe. Know when your battery is fully charged or in need of recharging. Eliminate trouble and unnecessary expense by buying an inexpensive

INDESTRUCTIBLE

## MONARCH

Storage Battery Tester

*Unbreakable, absolutely accurate, convenient to carry around, guaranteed for five years*

### Monarch Ammeter

For testing dry cells up to 30 amperes. Guaranteed absolutely accurate. Unlike all other ammeters the MONARCH cannot be injured by hard service, even abuse. No glass dials or delicate working parts. Can be safely carried in your tool kit. Small enough to fit in the vest pocket. Unbreakable and guaranteed for five years.



PRICE \$1.00

**Hercules Instrument Company**  
Mt. Vernon      Dept. MA      N. Y.

### Monarch Storage

### Battery Tester

Accurately indicates the condition of the charge in storage batteries. Made in two sizes for six and twelve volt batteries. Tells you when your battery is fully charged, half charged, or in need of recharging. Built like the Monarch Ammeter—unbreakable and absolutely accurate. Buy one today, and keep it handy in your tool kit. You can never tell when you may need it badly. You will never need but one.

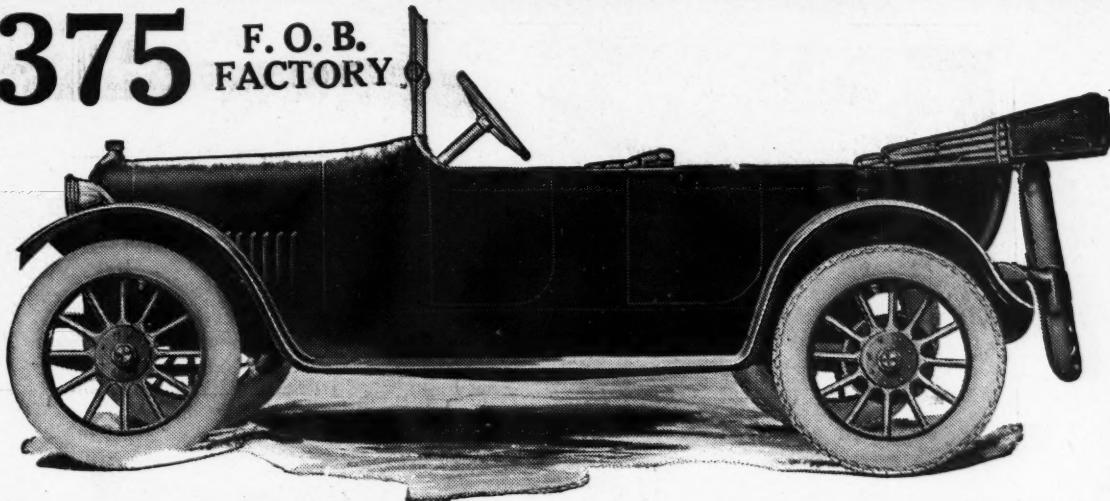
PRICE \$1.50



Recharge →  
Charged →



**\$1375** F. O. B.  
FACTORY



## MORE POWER—MANY REFINEMENTS

### Reduction of \$100 in Price

WITH an increase in power and many refinements, the new Moline-Knight 40 at a reduction of \$100 in price, gives the dealer a car that is practically free from competition. The Knight sleeve valve motor in general, and the Moline-Knight in particular, is conceded to be the nearest approach to mechanical perfection. The

**\$1375**

#### Specifications

Light weight—2896 pounds filled with gas, oil and water.  
118 inch wheelbase.  
3  $\frac{3}{4}$  inch bore.  
5 inch stroke.  
40 horsepower.  
34x4 inch tires (non-skid rear).  
Selective three speed transmission with center control, left hand drive. Transmission placed midship, with double universal connection between engine and transmission.  
Cone leather faced clutch with cork inserts.  
Dynamo with storage batteries. Head lights equipped with dimmers.  
Lubrication by force feed, gear driven pump.  
Connecticut high tension ignition system.  
Electrically lighted and started.  
Worm and sector steering gear.  
Floating spiral bevel gear rear axle.  
5 passenger touring car and 2 passenger roadster.  
Complete equipment.

## Moline-Knight

#### Equipped with World's Greatest Motor

at \$1375 is an asset that will increase your revenue, because once a man drives a Moline-Knight, he never returns to a poppet valve motored car. The Moline-Knight exclusive rear spring suspension, strongest frame ever constructed, three unit body, increased bore and unparalleled Knight sleeve valve motor, together with the specifications at your left, makes it one of the most desirable cars on the market.

If you are in unoccupied territory, write for our dealer's proposition, or better still, come to the factory and see for yourself the exacting care with which Moline-Knights are manufactured.

**Moline Automobile Company**  
East Moline, Illinois, U. S. A.



*Announcing*  
**Campbell Detachable Upholstery**

(The First of a Series of Full Page Advertisements in  
 The Saturday Evening Post, Literary Digest, etc.)

**W**HAT a Paris frock does for a woman, Campbell Detachable Upholstery does for a motor car—**classes** it.

Over the shabby upholstery of last year's car, or the shining newness of this year's, it works a genuine transformation. At a stroke, it gives the interior trim a luxurious look, a soft warmth and **tone**, found only in the finest limousines.

There is a set specially designed for practically every model of every car. It fits over the regular upholstery like the upholstery itself, becoming in appearance an inherent part of the car body. Any one can install it—no alterations are necessary. With a snap of its fasteners you adjust each hand-tailored part over seats, backs, arms and doors. With equal ease you slip it off for cleaning.

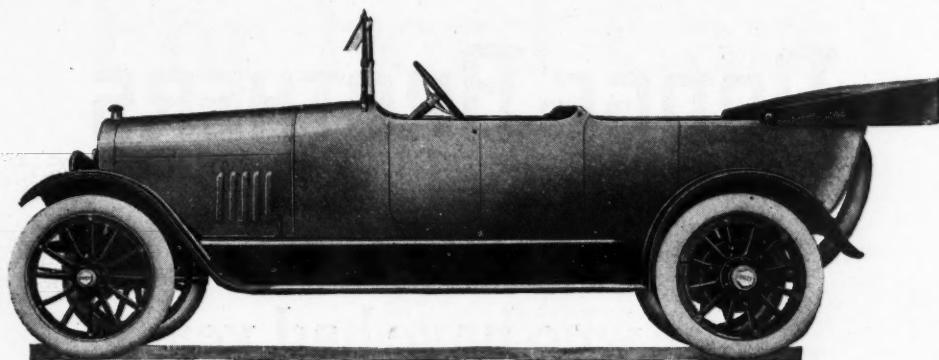
There is the same satisfaction in owning a car equipped with Campbell Detachable Upholstery that there is in being faultlessly dressed. There is an added comfort, and a very practical satisfaction, in the always cool, always clean seats. If you are buying a new car, ask to see it equipped in this latest style. If you want to make an old car look like new again, order its particular set of Campbell Detachable Upholstery from your dealer—today.

**Dealers: Write for folder of fabric samples and discounts**

Campbell Detachable Upholstery is made in a variety of smart motor fabrics and linens, to harmonize with cars of every color. Send for folder showing actual samples, and price list, with special discounts to the trade. Address The Perkins-Campbell Co., 624 Broadway, Cincinnati, Ohio. New York Office, 89 Chambers St.



The name *Campbell*  
 on the fasteners is  
 the quality mark of  
 genuine *Campbell*  
 Detachable Uphol-  
 stery.



## ENGER TWIN SIX

*12 Cylinder*

# \$1095

## Dealers Wanted

A twelve cylinder car for 1095!

And it is not in the blue print stage.

Demonstrations are going on now.

We can make deliveries very shortly.

A big production is under way.

Some choice territory still open.

Applications should be filed now.

Back of this car is one of the strongest concerns in the entire automobile industry.

Refer to your Dun or Bradstreet.

Wire when you will be at the factory.

Come down and drive this car yourself.

*Twin Six—12 Cylinders  
2½" bore x 3½" stroke*

*Valve-in-head motor  
Cantilever springs*

*115-inch wheelbase  
Pure stream line body*

*Electric lights and starter  
Complete in every respect*

Literature on request

**The Enger Motor Car Co., Cincinnati, Ohio**

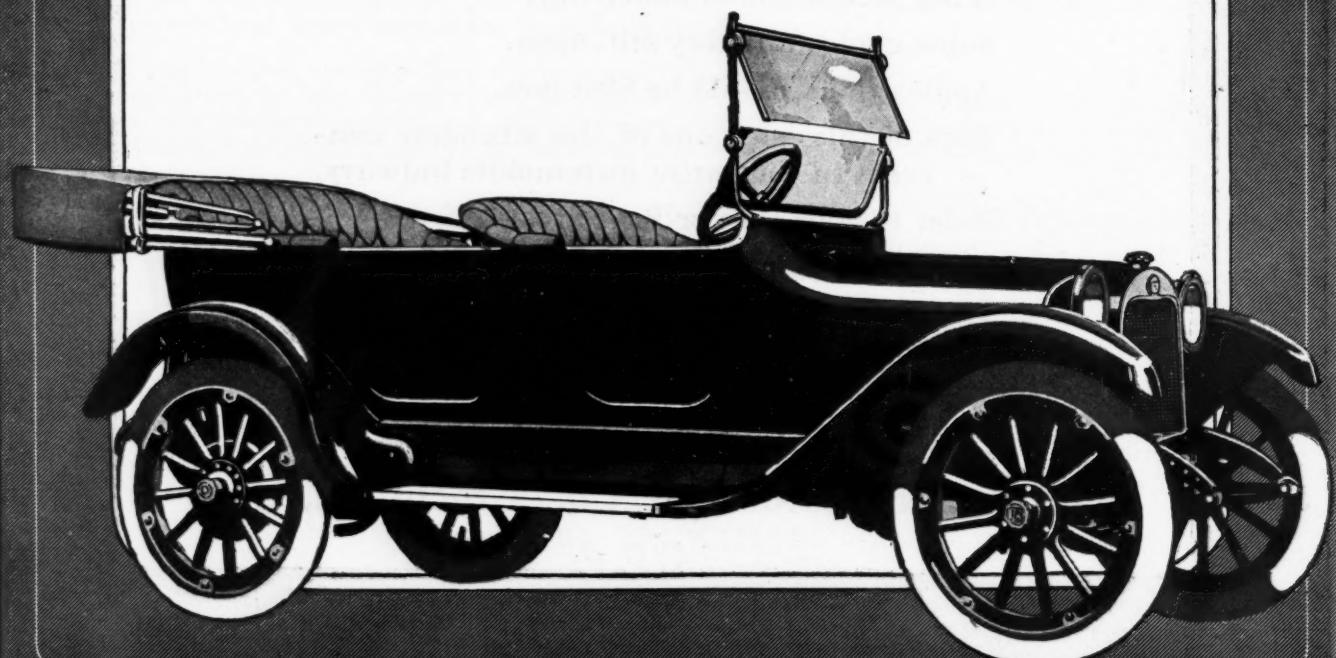
# DODGE BROTHERS MOTOR CAR

**Those who have had years  
of experience driving mo-  
tor cars are its most enthu-  
siastic owners.**

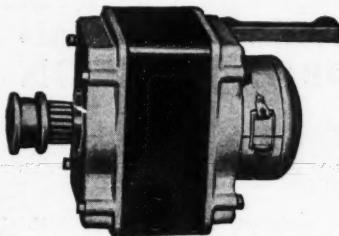
The car satisfies them completely. They admire its beauty. They dwell upon its comfort. They insist in the most emphatic way upon the high quality of its performance.

The motor is 30-35 horsepower  
The price of the Touring Car or Roadster  
complete is \$785 (f. o. b. Detroit)  
Canadian price \$1100 (add freight from Detroit)

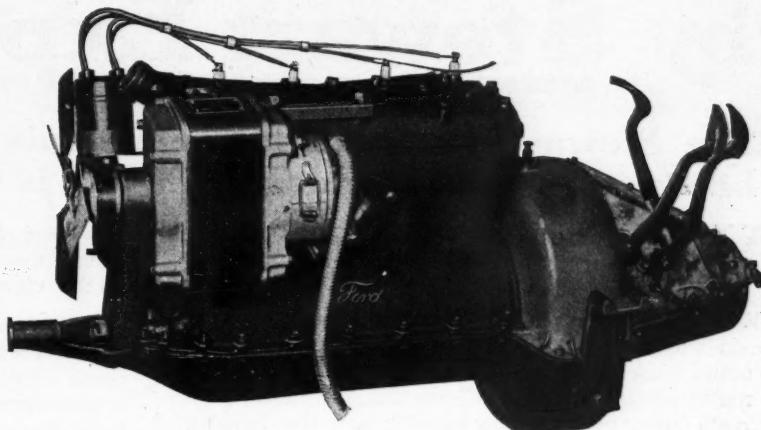
**DODGE BROTHERS, DETROIT**



# Westinghouse Starting, Lighting, Ignition For Ford Cars



Motor Generator with Bracket



No change required in engine. Silent chain drive to crankshaft. Simple connections. Durable construction. Battery, wiring and all parts included. Folder 4311-A gives full particulars.

Installations made complete at Westinghouse Sales Service Stations and Agents listed herewith:

BOSTON, MASS.—Motor Parts Co.

BUFFALO, N. Y.—Motor Parts Co.

CHICAGO, ILL.—Westinghouse Sales Service Station.

CHICAGO, ILL.—Motor Car Supply Co.

CLEVELAND, O.—Westinghouse Sales Service Station.

CLEVELAND, O.—The Auto Electric Equipment Co.

DETROIT, MICH.—Westinghouse Sales Service Station.

INDIANAPOLIS, IND.—Westinghouse Sales Service Station.

KANSAS CITY, MO.—The Equipment Co.

MEMPHIS, TENN.—Lilly Carriage Co.

MINNEAPOLIS, MINN.—Reinhard Brothers Co.

NEW ORLEANS, LA.—Shuler Rubber & Supply Co.

NEW YORK, N. Y.—Westinghouse Sales Service Station.

OELWEIN, IOWA—Chas. W. Bopp.

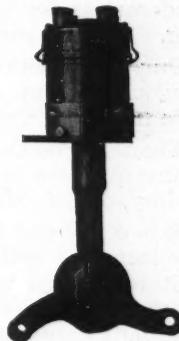
OKLAHOMA CITY, OKLA.—Severin Tire and Supply Co.

OMAHA, NEB.—Powell Supply Co.

PHILADELPHIA, PA.—Motor Parts Co.

PITTSBURGH, PA.—Pittsburgh Auto Equipment Co.

SPRINGFIELD, MASS.—Motor Parts Co.



Ignition Unit and Bracket

**Westinghouse Electric & Manufacturing Co.**

Automobile  
Equipment Department



Shadyside Works  
Pittsburgh, Pennsylvania

# *Stewart* Speedometer is MADE in Stewart Factories by Stewart Experts

**The Stewart Speedometer represents no divided responsibility—the MAKER and the SELLER is ONE ORGANIZATION**

**W**E do not trust ANYBODY ELSE to make the Stewart Magnetic Type Speedometer for us, or for you.

We make it ourselves. We buy the materials. We do the manufacturing. We do the inspecting. We stand back of the Stewart Speedometer from the raw materials to the finished product. It is made in our own factories by experts who are the leading specialists in this line. They have been building speedometers for years. Their work is not new to them. You are running no chances.

Our organization not only *makes* the Stewart Speedometer, but also *markets* it directly to the entire trade.

There are no GO-BETWEENS. There can never be any question of "divided responsibility" when you buy, or use, Stewart Products.

95% of all Car Manufacturers know these facts and willingly pay more for the Stewart Magnetic Type Speedometer than for any other make, because with it they also get *Stewart Prestige, Stewart Quality*,

**Regular Equipment by**

**95%**

**of ALL Car Manufacturers.**

**Why?**



**Stewart-Warner Speedometer Corporation**

Executive Offices: 1931 Diversey Blvd, Chicago

15 BRANCHES—Boston, Buffalo, Chicago, Cleveland, Detroit, Indianapolis, Kansas City, Los Angeles, Minneapolis, New York, Philadelphia, St. Louis, San Francisco, London, Paris  
78 SERVICE STATIONS IN ALL CITIES AND LARGE TOWNS

Factories: Chicago and Beloit, U. S. A.

*When Writing to Advertisers, Please Mention Motor Age*

*Stewart Service and Stewart Satisfaction*—elements that are as essentially a part of what you buy as the elements of material and manufacture.

Car manufacturers almost universally use the Stewart Magnetic Type Speedometer as standard equipment on their cars. When it comes time to decide on a speedometer they *have no other in mind*. They long ago gave up testing various makes of speedometers and different principles. They now contract year after year for the Stewart Magnetic Type Speedometer, because it has stood the hardest tests of time and actual usage on over 1,500,000 cars. Car manufacturers found it "poor economy" to take any chances at all on *unknown, untried principles* of speedometer construction. They want only the speedometer with a reputation—the STEWART.

We have long had established the most complete, widespread accessory organization in America, of 15 Branches and 78 Service Stations to guarantee the maintenance of all Stewart Products, no matter who purchases them or where purchased.

**"Always on the Job"**

**COSTS MORE,  
but Everyone knows it  
is WORTH it.**



# 1916

## HOLLIER EIGHT

**Look at the 1916 Announcements—  
And compare the HOLLIER Eight**

**\$985**

8 cyl., V Type, 3x3½ motor  
3 point suspension  
Electric starting and lighting  
Full floating rear axle, annular bearings  
40-inch cantilever rear springs

112-inch wheelbase

32 x 3½ non-skid tires on  
demountable rims

Beautiful streamline body

Deep, comfortable  
upholstery

One-man top

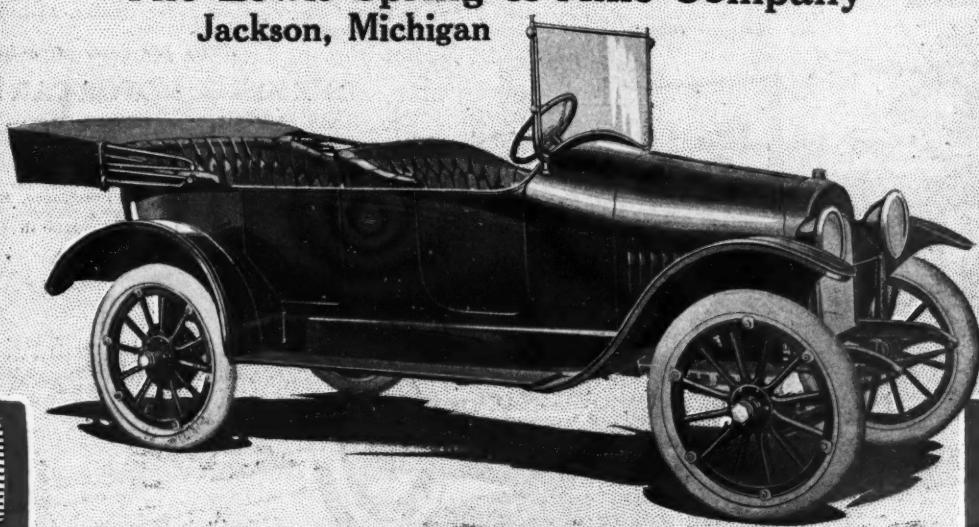
Quick adjusting side curtains

**Look at all the 1916 cars—**

**But buy a HOLLIER Eight, better equipped than any other car selling below \$1,000.**

**Dealers—The HOLLIER Eight has the best selling points of any car in its price class. Write today.**

**The Lewis Spring & Axle Company  
Jackson, Michigan**





# KISSELKAR

EVERY INCH A CAR

\$1050

## See This Great Car Before You Buy

A smaller car—that is the only essential difference between the new 32-Four at \$1050 and the other Kissel Kar models. It is a quality automobile—worthy of its name in every respect.

It has rare beauty—115 inch wheelbase, ideal proportions, plenty of room, lines sweeping and graceful, finish lustrous, equipment complete. The same sterling, inbuilt worth is there—the same superior grade of material and of workmanship—the same distinguished appearance as has always characterized KisselKars.

## The ALL-YEAR Car

THE 32-Four Chassis is also available with the new KisselKar four passenger roadster body—the same as the more expensive models. This model, which is specially built, is listed at \$1150.

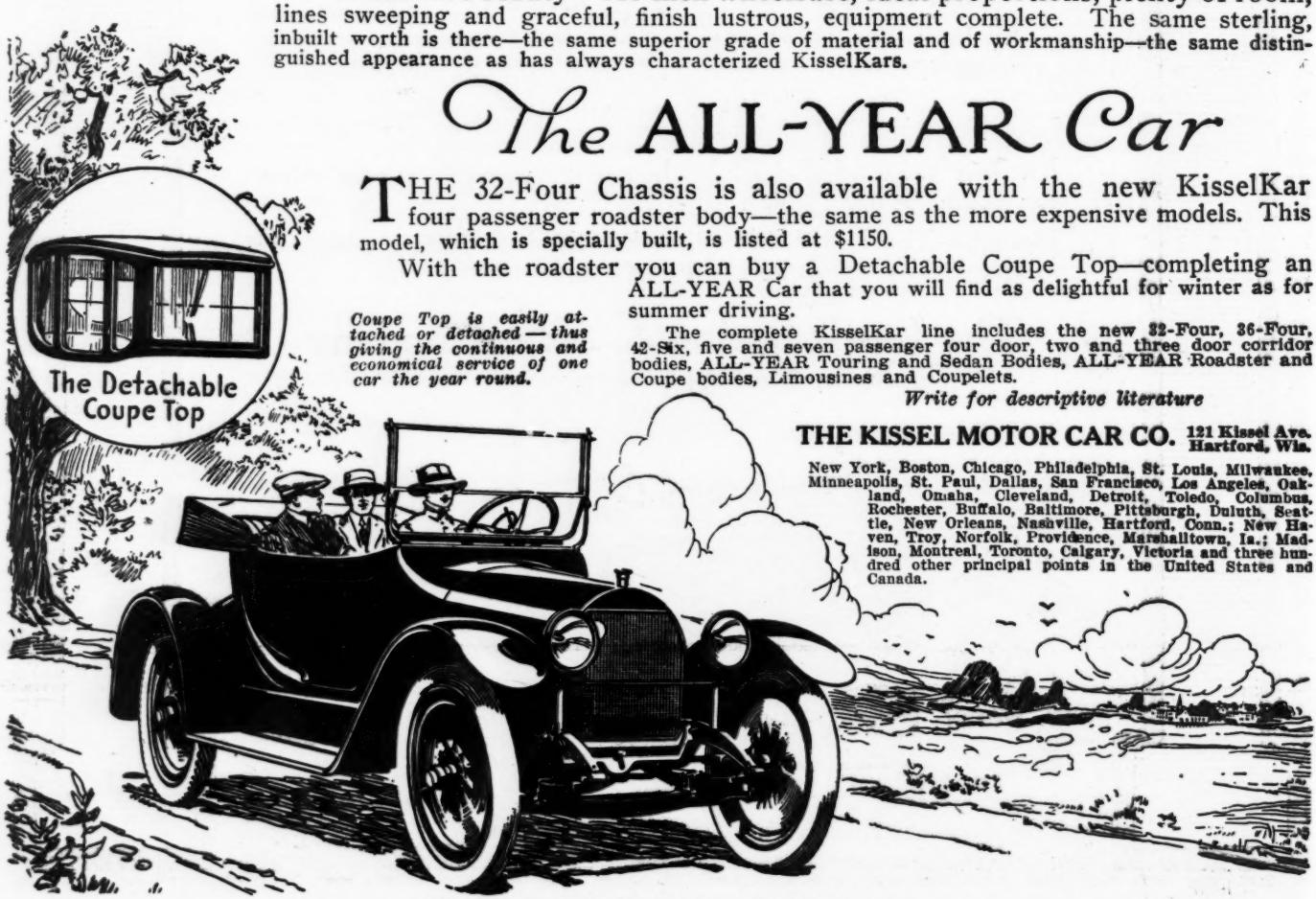
With the roadster you can buy a Detachable Coupe Top—completing an ALL-YEAR Car that you will find as delightful for winter as for summer driving.

The complete KisselKar line includes the new 32-Four, 36-Four, 42-Six, five and seven passenger four door, two and three door corridor bodies, ALL-YEAR Touring and Sedan Bodies, ALL-YEAR Roadster and Coupe bodies, Limousines and Coupelets.

*Write for descriptive literature*

### THE KISSEL MOTOR CAR CO. 121 Kissel Ave. Hartford, Wis.

New York, Boston, Chicago, Philadelphia, St. Louis, Milwaukee, Minneapolis, St. Paul, Dallas, San Francisco, Los Angeles, Oakland, Omaha, Cleveland, Detroit, Toledo, Columbus, Rochester, Buffalo, Baltimore, Pittsburgh, Duluth, Seattle, New Orleans, Nashville, Hartford, Conn.; New Haven, Troy, Norfolk, Providence, Marshalltown, Ia.; Madison, Montreal, Toronto, Calgary, Victoria and three hundred other principal points in the United States and Canada.



*When Writing to Advertisers, Please Mention Motor Age*



## "The Car Owner Can't Tell the Difference"

So says the cheap-battery maker to the car builder.

He means that you can't tell it *at the time you buy your car*.

For it doesn't take long for pine boxes, imperfect jars and soft plates to cause battery trouble. And when your engine stalls and your lights go out some night out in the country you soon find out the difference between cheap batteries and Willard batteries.

That's why 143 car builders—more than 85% of all in the United States—are glad to be able to buy Willard batteries at a slightly higher cost.

To insure your satisfaction they're willing to pay for the extra hard oak in Willard boxes—for grooving and fastening the corners with maple dowels—for rubber jars that survive the ordeal of a 3600 pound test for tensile strength and a 24,000 volt test for flaws—for plates that won't bend—for duplex sealing—for lead coating of screws, and for the many other exclusive Willard features.

They know that a storage battery is only as strong as its weakest part, and a slight imperfection may send you back to the crank.

You don't need to be an expert to tell a cheap battery. Just send for "Truth Telling Tests," a valuable booklet for the car-owner. And you ought to have "Your Storage Battery, What It Is and How To Get the Most Out of It." A request for Bulletin No. R-7 will bring both booklets.

## Willard Storage Battery Company

Cleveland, Ohio

New York: 228-230 W. 58th St.  
Chicago: 2524-30 So. Wabash Ave.

Indianapolis: 318 North Illinois St.

Detroit: 736-40 Woodward Ave.  
San Francisco: 1433 Bush Street

Sole European Representative: The  
British Willard Battery Co., Ltd.  
46 Poland St., London, W., England

Direct Factory Representatives In:  
Philadelphia, Boston, Atlanta, Dallas,  
Kansas City, Omaha, Minneapolis

Service Stations in All the Principal Cities in the United States, Canada and Mexico

*Announcing  
the 1916*

*Pullman*

**The  
Palace Car  
of the Road**

Our policy has always been not to cheapen our car but to maintain our "standing" as **Builders of Cars of Quality.**

Increased quantity production, made necessary by the tremendous demand for PULLMANS all over the world, has enabled us to supply this season The Palace Car of the Road at a price within the reach of all.

A  
Startling  
Revelation  
of What  
Can Be  
Embodied  
in a  
Motor Car  
for

**\$740**

F. O. B. York, Pa.



**Specifications in Brief**

Motor, four cylinder,  $3\frac{3}{4} \times 4\frac{1}{4}$ . Wheelbase, 114 inches. Springs, cantilever. Lighting and starting, Apelco system. Ignition, "Dixie" Magneto. Body, PULLMAN standard streamline, trimmed in genuine leather. Tires,  $3\frac{1}{2} \times 4$ , non-skid all around, standard make. Equipment, complete.

Built in TOURING—5 passenger  
ROADSTER—3 passenger, clover leaf type  
2 passenger standard

The volume of cars to be built in 1916 enables us to consider a few more responsible dealers. Perhaps you are located in some unoccupied territory. Our proposition is very interesting. Write or wire.

*Catalog on Request*

**Pullman Motor Car Company**  
York, Pa., U. S. A.

Export Dept., 100 Broad St., New York, N. Y.



August  
Twenty-fifth  
1915

Stromberg Motor Devices Co.,  
64 East 25th St.,  
Chicago, Ill.

Gentlemen:-

We are pleased to inform you that the Stutz cars driven by Mr. Cooper and Mr. Anderson on Friday and Saturday last at Elgin were equipped with your model "H" carburetors. They gave us sufficient service to enable us to win first and second place both days, a performance which has never been surpassed on either side of the water by any car, or any team of cars.

We congratulate you on your product and on the service rendered us.

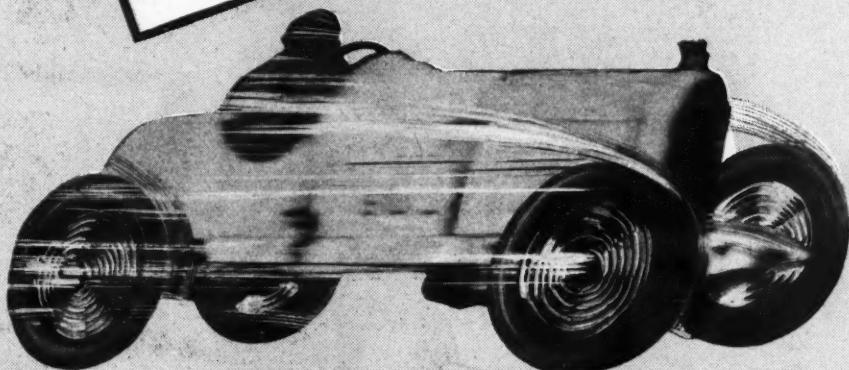
Wishing you the success you deserve, we are,

Very truly yours,  
Stutz Motor Car Company

*H. C. Stutz*  
President & General Manager

HCS/RG

ADDRESS ALL COMMUNICATIONS TO THE COMPANY AND NOT TO INDIVIDUALS



# New **STROMBERG** Does it! CARBURETOR

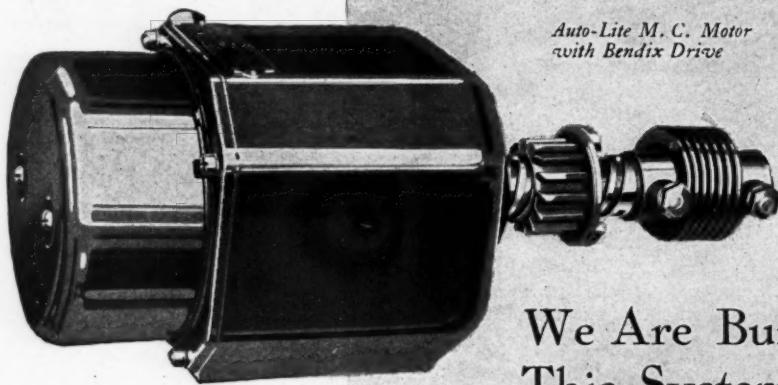
Stromberg Motor Devices Co., Dept. G., 64 E. 25th Street, Chicago

When Writing to Advertisers, Please Mention Motor Age



# Electric Auto-Lite

## STARTING - LIGHTING - IGNITION



*Auto-Lite M. C. Motor  
with Bendix Drive*

We Are Building  
This System For  
The Chevrolet

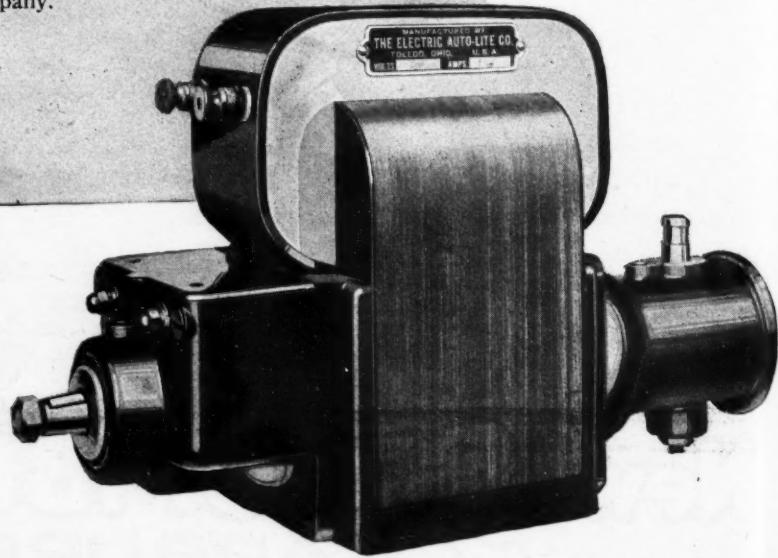
Auto-Lite efficiency—Auto-Lite mechanical excellence—combined with our ability to make quantity deliveries of built-to-order electrical systems, caused Chevrolet officials to select Auto-Lite for their new models.

We furnish the Chevrolet with a system specially designed and constructed to meet certain fixed requirements.

In the same way we have developed starting and lighting systems for each of our patrons.

And—

Our satisfied patrons are the biggest asset of this company.



*Auto-Lite G. F.  
Generator*

**The Electric Auto-Lite Co.**  
Home Office and Factory, Toledo, O.

New York

Detroit

Kansas City

San Francisco

*When Writing to Advertisers, Please Mention Motor Age*



# WINS

Finishing 1st and 2d in Chicago Automobile Trophy  
and Elgin National Trophy Races

Averaging 74.85 and 77.25 miles per hour

# AGAIN

The Road Race Champion of America for 1915  
and now

Road Race Champion of the World

**STUTZ MOTOR CAR COMPANY**  
INDIANAPOLIS, INDIANA

*National*

**HIGHWAY**  
**12 \$1990 6 \$1690**

**Public Opinion  
—A Commodity**

When an automobile dealer takes on the National line he gets a commodity to sell as valuable as any part of the car's construction—it is the force of Public Opinion that makes these "Highway" cars popular.

It is the same with all master products of brains and experience. Of "second choices" there are many, but in the select group of the few superior cars, the National ranks pre-eminent.

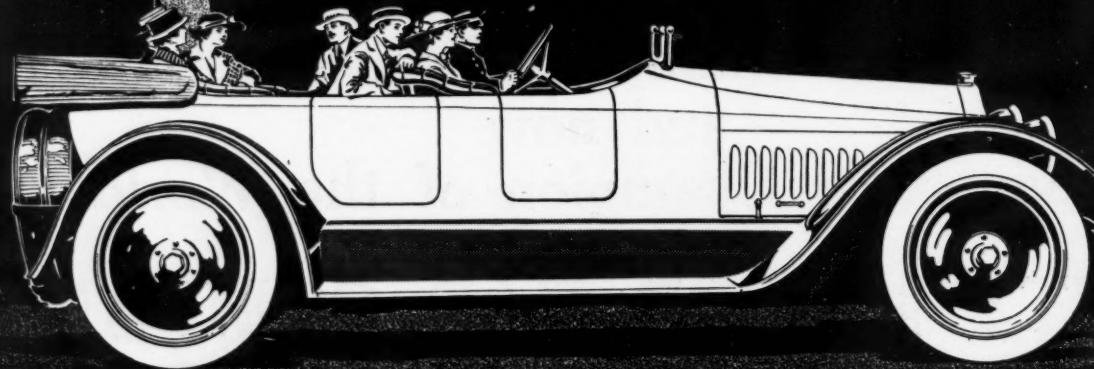
This has an actual cash value to the dealer. It saves him explanations—it precludes doubt—it gives a guarantee most convincing—it attracts buyers and it makes proud owners.

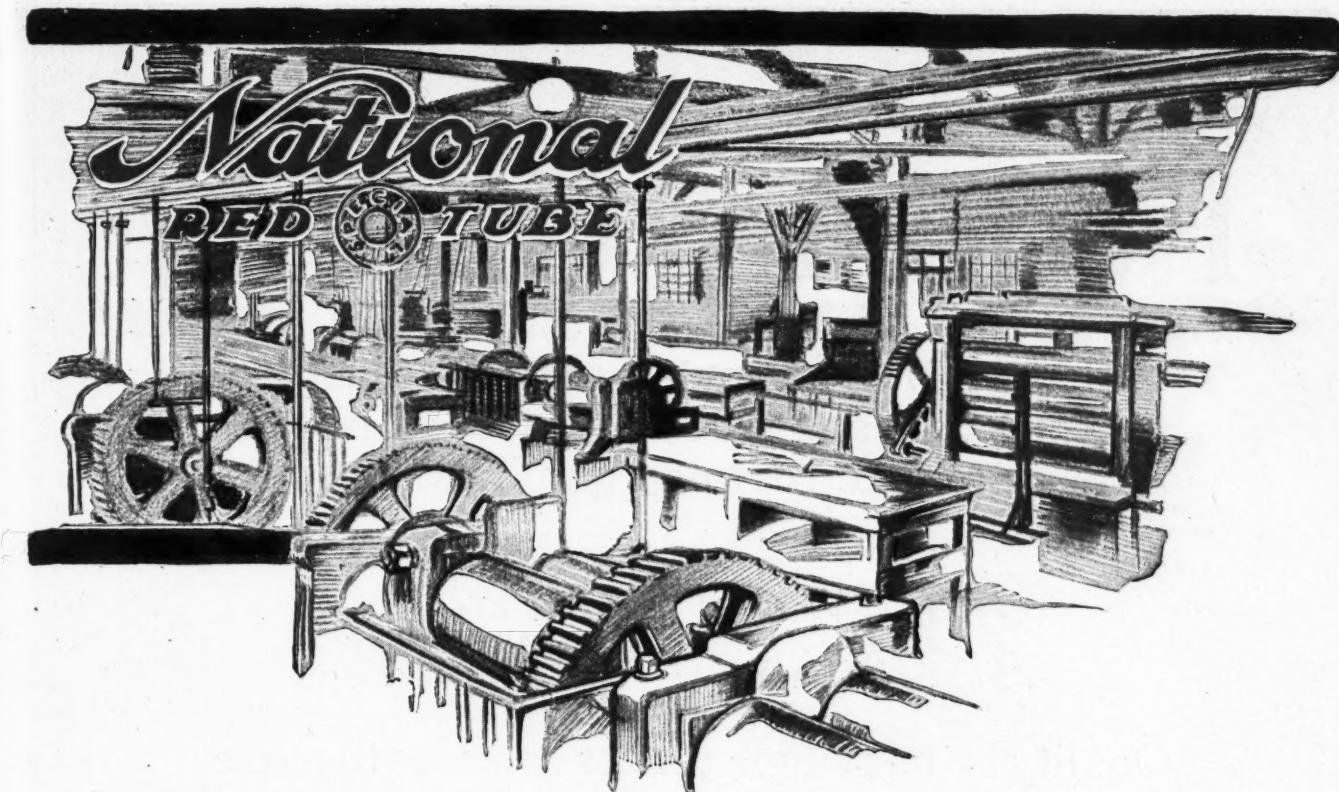
No human being is immune to the influence of Public Opinion. No car buyer but desires to have the best in appearance, construction and performance, and no motor car dealer but knows that it is only the reputation of the National builders for fifteen successful years that makes possible this prestige and universal recognition accorded the "National."

That these models are complete in every respect—that they are advanced in design and finish and that they are capable of years of service, is accepted as a matter of course. With such a reputation as this to live up to the National builders have produced cars for 1916 that even further enhance the Public's Opinion of "National."

Built by the builders of the World's Stock Car Champion.

**National Motor Vehicle Co.**  
Indianapolis  
Indiana





### "Mixing"

No commercial rubber is absolutely pure. Other substances must be mixed with pure rubber before it is cured to improve its natural properties.

To do this, raw rubber is first worked up in big machines, in much the same way as bread. It is first made into dough, the curing compound is then mixed into it, then it is rolled out as you would make bread, thick or thin, according to requirements.

Although natural sulphur is the best of most compounding materials the formulas vary greatly, and to secure a compound which will give the best possible results is the aim of every rubber factory, and once a satisfactory formula is secured it is kept a close secret.

After the raw rubber is thoroughly mixed with the compound it is allowed to rest in the drying room for three weeks before it is taken to the tube department.

**Point for point National tubes are distinctly better than most tubes. No one single thing is responsible for their superior quality.**

Although Up-River Fine Para Rubber is used throughout, the finest and most expensive tube stock obtainable,

—Although our equipment is new and of the most advanced type,

—although our formula for compounding and our special process of curing have no equal,

—although we employ the most skillful workmen and have a model daylight factory.

—these are things that any rubber factory can buy.

It is in the intelligent, experienced application of these things, in the continuity of purpose, in the very constant effort to make tubes that are distinctly better than you find the answer to the lasting service and satisfaction to be derived from National tubes.

National tubes are built BY HAND, extra thick, of many thin layers of rubber instead of one thick sheet, with the valve base cured integral with the tube and not merely pasted in. They are guaranteed non-porous and proof against deterioration for one full year.

They are built of the stuff that resists heat. They are remarkably tough and elastic. They will increase the natural mileage of any tire and outwear any tire built. They will reduce tire expense and make you forget tire troubles.

If you have yet to try a National special buy one today. Order direct if there is no dealer in your town.

Dealers: There are a few exclusive territories still open. Write for discounts, terms, etc.

Size	Price	Size	Price
28x3	\$3.10	36x4	\$5.90
30x3	3.20	37x4	6.10
30x3 1/2	4.10	34x4 1/4	7.10
31x3 1/2	4.25	35x4 1/2	7.25
32x3 1/2	4.40	36x4 1/2	7.50
34x3 1/2	4.70	37x4 1/2	7.75
36x3 1/2	5.00	35x5	8.50
		36x5	8.70
31x4	5.20	37x5	9.00
32x4	5.30	39x5	9.50
33x4	5.50		
34x4	5.65	37x5 1/2	10.30
35x4	5.75	38x5 1/2	10.50



**National Rubber Company**  
Factories and Main Offices

Pottstown Pa.

When Writing to Advertisers, Please Mention Motor Age

# Fedders Quality

Many of the foremost manufacturers of pleasure cars and trucks are shrewd enough to discriminate between qualities and attributes.

*Quality is Perceived  
Attributes are Ascribed*

Quality is that which makes or helps to make a thing what it is.

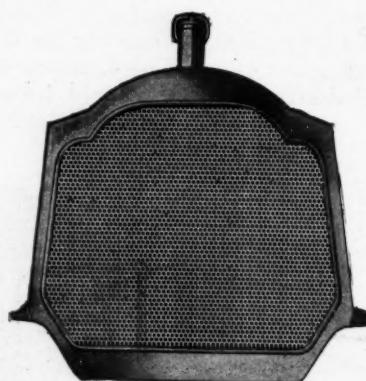
Fedders quality is what makes or helps to make Fedders Radiators the most efficient—it is a fact—something that is perceived; not merely an attribute we have ascribed to them.

Fedders Quality is worthy of your consideration—adoption.

**Fedders Manufacturing Co., Inc.**

BUFFALO

NEW YORK



# Connecticut Automatic Ignition Makes a Car as Capable on the Hills as on the Level



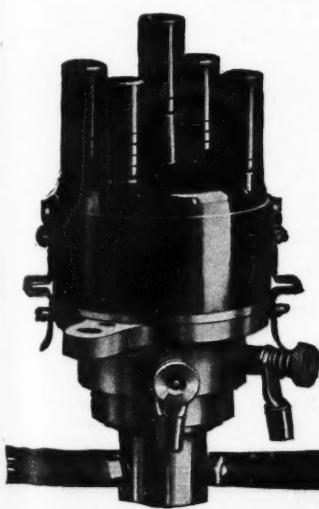
Driving holds no greater thrill than to sit at the wheel of a car which can take the grades as they come and sustain the same flexibility on them as on the level.

## AUTOMATIC IGNITION CONNECTICUT

makes the motor master of every situation, because it delivers a spark tempered exactly to the motor's requirements—a spark that grows more powerful as the motor slows down under increasing load—a spark that insures sustained power and an unfaltering motor.

In a car equipped with CONNECTICUT AUTOMATIC IGNITION you can do this.

**CONNECTICUT TELEPHONE & ELECTRIC CO., Inc., Meriden, Connecticut**  
Ford Dealers—Write for information regarding Connecticut Automatic Ignition for Ford Cars—A. J. Picard & Co., Sole Agents, 1720 Broadway, N. Y.



*When Writing to Advertisers, Please Mention Motor Age*

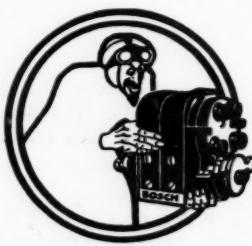
# Every Prominent Driver Uses The Sure Ignition Bosch Magneto

**T**HREE is no difference of opinion among these close students of the motor car. They have adopted Bosch Magneto Ignition without question, not only because Bosch is more speedy, not only because Bosch is more capable, but mainly because Bosch Magneto Ignition is

## —Absolutely Reliable—

A broad statement, but proved by facts; for not a single driver in any of the big contests of 1915 experienced a moment's trouble with his magneto during the terrific pace set by the leaders.

Bosch Magnetas hold  
all the new racing  
records of 1915



BOSCH  
214 W. 46th St.  
N. Y.

If you want Reliable  
Ignition, Be Satisfied  
Specify Bosch

# Built for Service

## Tempered Rubber Tires

### Make Good Under All Conditions



"We have just taken off a 37x5 QUAKER, plain casing, which has been driven 14080 miles. Aside from the tread being cut and torn, casing is in good condition.

"Same party used two 37x5 QUAKER, plain casings, one giving 12085, the other 13000 miles. These casings have been used on the rear wheel of a very heavy car having a wheel base of 181 inches and used in taxi and livery service in all kinds of weather."

Yours for success,

(Signed) WOLFE & YAUS.

Newark, O., June 11, 1915.

True, more is sometimes claimed for other tires, but do the tires **YOU** use give equal mileage under just normal conditions?



Tempered  
Rubber

**TIRES**

Pat.  
May.  
1913.  
T. T. T.  
Reg. U. S.  
Pat. Off.

Study this dissected-tire illustration and you will see some of the reasons why these tires make mileage records of 8000, 10000 and up to 20000 miles. But even more than the sturdy construction, our secret process of TEMPERING the rubber is back of this wonderful excess service.

#### Dealer, Investigate

Our "Square-Deal" policy, national publicity and concentrated direct advertising to buyers in your territory will make money for you fast. Address Mr. Moore.

#### Consumer, Economize

Many users report mileage records of two, three and up to five times that of our liberal guarantee. This suggests that you use QUAKER TIRES even if you have to order direct from our factory or nearest branch. Address Mr. Lyons.

## QUAKER CITY RUBBER COMPANY

Factory and Home Office, PHILADELPHIA

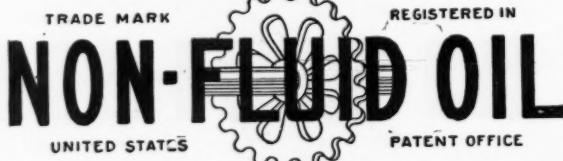
CHICAGO  
182 West Lake Street

PITTSBURGH  
211 Wood Street

NEW YORK  
207 Fulton Street

## More Power for Your Car

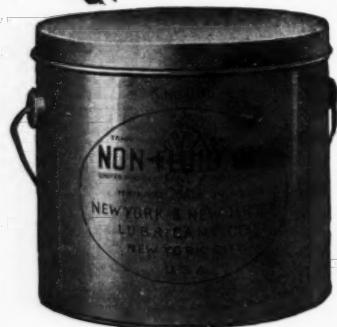
The efficiency of your car is determined by comparing the useful power delivered to the driving wheels with that which is lost by friction. Friction and loss of power is costly. All of which emphasizes the vital necessity of using—



"K No. 00 Special"  
grade for sliding gear transmission

### BECAUSE

**X** No. 000" for differential, compression caps and all bearings



NON-FLUID OIL reduces friction to a minimum by providing a durable, pressure-resisting cushion between all contact surfaces. It delivers the maximum of power to the driving wheels, thereby insuring you the greatest efficiency from your car, with the least loss of power and with the least wear.

### BECAUSE

NON-FLUID OIL is strictly neutral—hot or cold, wet or dry, its consistency never changes. It does not leak off like LIQUID oils, nor gum up, decompose, or develop acidity and score the bearings like ordinary greases.

### BECAUSE

NON-FLUID OIL economizes upkeep. It lasts 3 to 4 times longer than LIQUID oils, and greases. Being of non-fluid consistency, it stays where put and lubricates perfectly to the last small particle.

Get a can today and try it in comparison with what lubricant you now use so there can be no question of doubt as to NON-FLUID OIL'S superiority.

*The original NON-FLUID OIL is identified by orange-colored cans bearing the above sprocket-wheel trade mark. Avoid substitutes.*

**New York & New Jersey Lubricant Co.**  
165 Broadway, New York. 1430 Michigan Ave., Chicago

## Lack of Knowledge Is Expensive

"THE AUTOMOBILE CATECHISM" (de luxe edition) is a complete course in automobile instruction—each subject discussed and illustrated so that YOU will grasp every point worth while—every subject is made as simple as A B C. You are interested—you are instructed—you are directly benefited. Its information is final.

It's a handsome piece of book work—splendidly printed, with 101 illustrations; flexible black leather binding, rounded corners and gold-edged pages—beautiful, while being intensely practical.

It will be to your immediate financial advantage to acquire an intimate and practical knowledge of cars and their parts.

We want every reader of Motor Age to have a de luxe copy of "The Automobile Catechism." To make our offer irresistible we have decided, FOR A LIMITED TIME ONLY, to CUT THE PRICE IN TWO. This half price (\$1.25) will prove the best investment you ever made. Remember, this is the de luxe edition—264 pages—every page full of real, money-interest value.



Special Price  
**\$1.25**

Regular Price **\$2.50**

Don't delay, send  
for this book today

**THE CLASS JOURNAL COMPANY**  
910 S. Michigan Avenue Chicago, Ill.

# Announcement

## 22-72 Series



A new series of Mercer cars, known as "22-72" models will be ready for delivery early in November. The "22-72" Mercers succeed the famous "22-70" line, which have achieved such pronounced popularity during the past season.

Following the usual Mercer policy of building a highly developed, medium-weight, four-cylinder car of known quality, and concentrating on its production, this new series adheres closely to the design of the preceding models. Several improvements and refinements have been made, but there are no radical changes in either chassis or bodies.

There is nothing sensational in Mercer cars. To our mind, the "ideal" and ultimate in motor car construction is a carefully built four-cylinder car, fast, powerful, light enough to be economical, low and properly balanced so it can be driven at speed with perfect safety, and body styles that are pleasing and perfectly harmonious in every detail.

The Mercer has always been built with this one ideal in mind. We have always believed in the four-cylinder motor, and consequently we have never stopped in our work of development and refinement. The natural outcome of such effort is superiority—and it is a recognized fact that Mercer cars are leaders in their class.

You will find the "22-72" Mercers conservative—yet they will stand out in marked dignity from the multitude. If conservatism means preference for engineering facts instead of theories; means holding fast to the good things learned in years of experience, and welcoming the lessons of each day, we are proud to be termed conservative.

### MODELS

Touring.....	Six-Passenger
Sporting.....	Four-Passenger
Runabout	
Raceabout	
Limousines and Town Cars	
Literature Mailed on Request	

**MERCER AUTOMOBILE CO.**  
800 Whitehead Road  
Trenton, N. J.

**GARFORD—**

*Hand Operated*

**\$3.85**



**With 45  
Safety Plunger**

**The Warning Signal  
That Will Not Fail**

Tremendous demand and facilities for manufacture often make GARFORD original prices as low as competitors' "slashes." The price of the new GARFORD Hand Operated Warning Signal is not cut—it always was \$3.85, it is \$3.85 today, and it will continue to be \$3.85 tomorrow. We can't afford to reduce GARFORD quality, because quality is why GARFORD never fails. Ask your dealer. Get your GARFORD now.

*Dealers*—The GARFORD line is complete and popular. It brings dealers big profits, through liberal discounts and sales. Nationally advertised. Write today.

**THE GARFORD MANUFACTURING COMPANY, 2503 Olive St., Elyria, Ohio.**

**Branch:** The Garford Mfg. Co., Kansas City, Mo. **Distributors:** Dean Electric Mfg. Co., Seattle, Wash.; Dean Electric Co., Los Angeles, Cal.; Sumter Telephone Supply Co., Sumter, S. C.

**A new price  
a new horn  
with the best  
of  
Garford Quality**

It makes no difference what you pay for a GARFORD Warning Signal—and it makes no difference what model you buy—

When you pay one of our dealers for a GARFORD, you get GARFORD quality and GARFORD service.

**Saves 15% On Your Car  
Insurance**

**Pyrene**  
TRADE MARK



**Puts Fires Out—Quick**

Brass and Nickel-plated Pyrene Fire Extinguishers are included in the list of Approved Fire Appliances issued by the National Board of Fire Underwriters, and are Inspected, Tested and Approved by, and bear the label of, the Underwriters' Laboratories, Inc.

**Thousands of dealers are now selling Pyrene**

*Write for our proposition*

**PYRENE MANUFACTURING COMPANY, 52 Vanderbilt Ave., New York City**



# FOR \$25

## And Your Ford Rebate Check Endorsed to Us

We will send you the Highest Grade and Most Efficient

### Electric Starting and Lighting Outfit

made for easy installation on Ford cars.

**The Same Efficiency You See  
in The Dyneto on the Franklin,  
Regal, etc.**

Works all the time, either as a starter or as generator. **Never a Stalled Engine.** Power so great that it actually assists the Ford engine on grades. **Never Robs Engine of Power.** Not made to meet a price, but to meet the Dyneto high standard of design, material and workmanship.

### We Guarantee Satisfaction or Money Back

SO GREAT IS OUR CONFIDENCE IN THIS OUTFIT THAT WE AGREE TO REFUND YOUR MONEY ON RETURN OF OUTFIT IN GOOD CONDITION, TRANSPORTATION CHARGES PREPAID, IF YOU ARE NOT PLEASED AFTER TEN DAYS' INSPECTION.

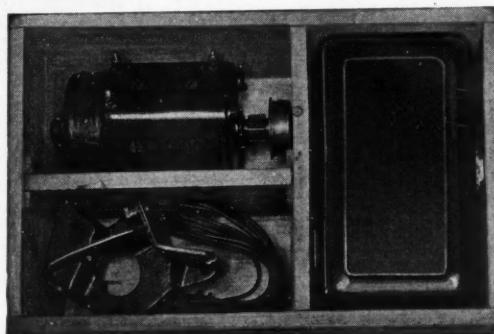
#### Simplest to Install

Outfit comes packed with complete instructions, even to marked terminals on wiring.

#### Any One Can Install

Some have done it in three hours.

*Booklet on request*



Outfit packed ready to ship



Storage Battery

DEPT. B.

*Attractive Proposition for Dealers and Distributors*

SYRACUSE, N. Y.

# THE STAUDE GLARE STOPPER



(Patent applied for)

## The Staude Glare Stopper

The heavy clear amber-colored crystal lens glass, 6 1/2 inches in diameter, dissects the light rays and eliminates all glare. The nickel plated clamp will fit on the windshield of any make of automobile.

### RETAIL PRICE

# \$2.50

The Staude Glare Stopper makes driving at night a constant pleasure instead of a constant fear. All glare from the headlights of approaching automobiles is eliminated by the Staude.

The Staude Glare Stopper is not "tinny" looking. It adds to the appearance of any automobile.

Made of heavy highly polished amber glass, the Staude will not curl or fade like celluloid.

A specially designed joint in the arm allows the Staude to be kept horizontal when not in use and perpendicular at night without regard to the angle of the windshield. The Staude will not work loose and rattle.

You can purchase a Staude from most dealers, or we will send you one by parcel post—C. O. D.

The Staude is sold with an absolute money-back guarantee. If you are not delighted with the Staude Glare Stopper and convinced you cannot get along without it, return it and your money will be refunded immediately.

### DEALERS

The Staude Glare Stopper is one of the fastest selling accessories on the market today. It solves the headlight problem at the right end. Our quantity prices for dealers and jobbers allow you a good margin of profit.

Write us now.

**E. G. Staude Manufacturing Co.**  
2675 University Avenue

St. Paul, Minn.

Dear Sirs:

Please send me by Parcel Post, C. O. D. \$2.50 prepaid, one complete

### STAUDE GLARE STOPPER

with the understanding that I may return it, if unsatisfactory, and get my money back.

Make of Car.....

Name .....

Address .....

City .....

State.....

## A Hot, Fat Spark Timed Accurately

The world's foremost engineers know this to be the secret of perfect ignition. Over 125,000 users of K-W Master Vibrators know that the large, powerful condenser and generous, solid, platinum iridium contact points found in their K-W Master Vibrators give that kind of a spark. You will get the same reliable and efficient service by demanding the original



## Master Vibrator

### Its Use Means

**Perfect Ignition—** A smoother running engine  
**More Power**

**One adjustment instead of four** Less carbon deposits—Less gasoline used

**A hotter spark—** Easier starting  
**Cleaner spark plug**—no worry



\$15.00 With Regular Kick Switch  
\$16.00 With K-W Autolock Switch

The K-W Master Vibrator, while resembling an ordinary vibrator, is really a scientifically constructed magnetic circuit breaker which times the spark more accurately and gives better and surer ignition on that high tension.

In buying your Master Vibrator be sure you get a K-W. Look for the K-W trade-mark and the serial guarantee number. They protect you against imitations. If your dealer can't supply you we will send one direct, postpaid, on receipt of price. Write for "That Satisfied Feeling Folder."



# FALLS<sup>TM</sup> TIRES



Falls Tires are made for those who want the best. They cost less per mile. Write for the proof.

## Guaranteed 5000 Miles

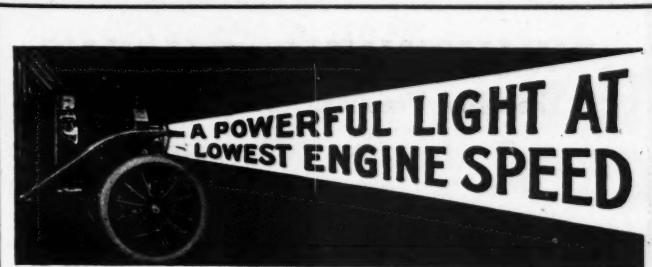
The Falls Rubber Company, Cuyahoga Falls, Ohio

### BRANCHES AND DISTRIBUTORS

The Falls Rubber Co. .... 2001 Euclid Ave., Cleveland, Ohio  
 The Falls Tire Co. .... 2307 Indiana Ave., Chicago, Ill.  
 The Denver Rubber Co. .... 516 16th St., Denver, Colo.  
 The Myers-Hoffman Tire Co. .... 1520 Jefferson Ave., E., Detroit  
 The Servus Vulcanizing Co. .... Tunnel St. & Webster Ave., Pittsburgh, Pa.  
 Naegle & Lamb Co. .... 1204 Hennepin Ave., Minneapolis, Minn.  
 Falls Tire Co. of New Jersey .... 64 Halsey St., Newark, N. J.  
 Royal Tire Co. of New York .... 833 7th Ave., New York, N. Y.  
 The Falls Tire Co. .... 633 N. Broad St., Philadelphia, Pa.  
 Costello-Lang Co. .... 556 Golden Gate Ave., San Francisco, Cal.  
 Seattle Tire & Rubber Co. .... 1624 Broadway, Seattle, Wash.  
 McAdams & McCrary .... Urbana, Ohio

# NEVER SLIP

When Writing to Advertisers, Please Mention Motor Age



AT LAST WHAT YOU HAVE LONG WAITED FOR

## The New York Automatic Headlight Controller For Ford Cars. Price \$5.00

### The Most Welcome Invention of the Age

Delivers a powerful light at the lowest engine speed. Uses the regular Ford magneto, requiring no batteries or complications. Entirely automatic in its operation—no belts, gears, or movable connections to the engine are employed. It also prevents the bulbs from becoming burned out at excessive engine speed. This is positively the first and only solution to the electric head light problem on Ford cars. We furnish necessary wires already connected so that any one can install in ten minutes by the simple removal and replacing of one bolt.

You need one—Why delay? Send \$5.00 with the understanding that you may return the device if you desire. Patents Pending.

## Install a New York Master Vibrator on Your Ford Car

And enjoy the smooth, evenly applied power so noticeable in six cylinder engines

Price \$8.00 at your dealer



It is immaterial if your car is the latest or oldest model.—You need our master vibrator, as it dispenses with all coil adjustments and replacements, and insures easy starting, a hot perfectly timed spark under all conditions, and entire freedom from ignition troubles. It has for the past six years proven itself to be su-

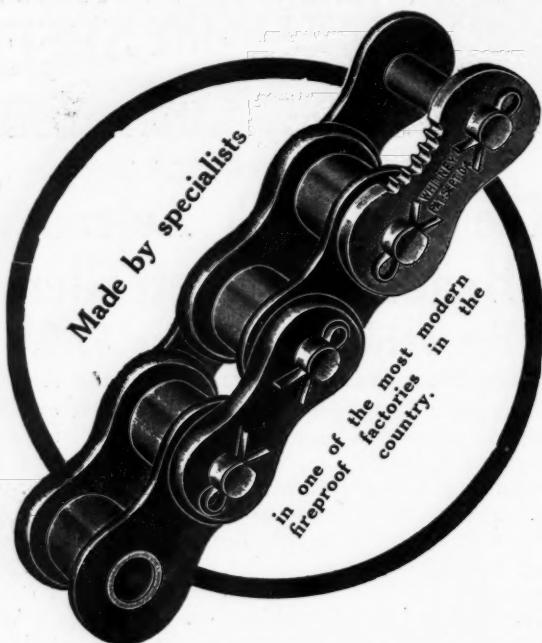
perior to any existing type. Though many times imitated it has never been equalled and stands today the best in its class at any price.

**NEW YORK COIL CO.**

341 PEARL ST. NEW YORK, N. Y.  
 WESTERN BRANCH, 1461 Michigan Ave., Chicago, Ill.

## "WHITNEY" CHAINS

The Most Practical for Motor Trucks



THE WHITNEY MFG. CO.  
HARTFORD, CONN.

Chains

Keys

Hand Milling Machine

"For Leaky  
Cylinders"



PATENTED AUGUST 6, 1912

## Coast to Coast with Ever-Tight Piston Rings

WHEN E. G. Baker established his coast to coast record of 11 days, 7 hours and 15 minutes, his Stutz Bearcat Motor was fitted with Ever-Tight Piston Rings.

Read Baker's opinion after the trip:

Gentlemen:—With reference to my recent trip from San Diego to New York I beg to advise that I owe much of my success to the Ever-Tight Piston Ring. Inasmuch as the car did not lack a bit of power, and the way it pulled through the sand and took the hills and mountains was certainly remarkable. The EVER-TIGHT Piston Rings truly deserve full credit for their reliability.

Yours very truly,

E. G. BAKER.

Confirm Baker's opinion yourself by trying Ever-Tight Piston Rings the first time your motor needs overhauling. They work as well in out-of-round cylinders as in perfect ones. Their three-piece construction prevents leakage and gives wonderful flexibility. They hold compression with minimum friction and never bind.

Ask your repair man.

We want jobbers and dealers in  
every city. Write for full particulars

THE EVER-TIGHT PISTON RING CO.  
1432 Chestnut St., St. Louis, Mo.

\$1.50

**KNOWLSON**  
**Spring Leaf Spreader**  
Makes Spring Lubrication Easy

**WARNING:** We advise the trade that we intend to rigidly prosecute every person, not authorized by us, who makes, sells, or offers for sale, any spring leaf spreader or opener with wedges, as they infringe our patent rights. To avoid complications insist on KNOWLSON'S Spring Leaf Spreader.

**Make Springs Last Longer**  
Don't let the leaves of your springs rust together, squeak, and break. Keep them alive all the time, with proper lubrication. Get 100% spring efficiency, and an easy-riding car, with KNOWLSON'S Spring Leaf Spreader and a little grease.

Fits any automobile spring. Simple, quick, effective. Won't damage or mar springs. Makes shock absorbers unnecessary.

Write for free illustrated circulars. Sent anywhere, prepaid, for..... \$1.50

Dealers Wanted  
SPRING LEAF LUBRICATOR CO.  
1004 Forest Ave.  
Ann Arbor Mich.

Note the Opening

When Writing to Advertisers, Please Mention Motor Age

## Guaranteed for 10,000 Miles



BRICTSON Pneumatic Tires are guaranteed for 10,000 miles and under a specific 10,000 mile written service guarantee. What more can you ask of a tire? With Brictson Tires, punctures, blowouts and rim-cuts are eliminated—they are proof against ruts, oil and gasoline. Resilient and easy riding, too.

### Try Them at Our Risk

Give Brictson Tires a free trial on your own car. Put them to test at our expense. Find out why Brictson Tires sales are increasing daily.

### Your Tires Rebuilt the Brictson Way

If the fabric in the tires now on your car is in good condition, we can take them and make them proof against rim cutting, punctures, blowouts, sidewall breaks, skidding, ruts and oil and give you thousands of miles of additional service.

Write today for full information about Brictson Tires. Tire Rebuilding and details of our liberal Free Trial Offer.

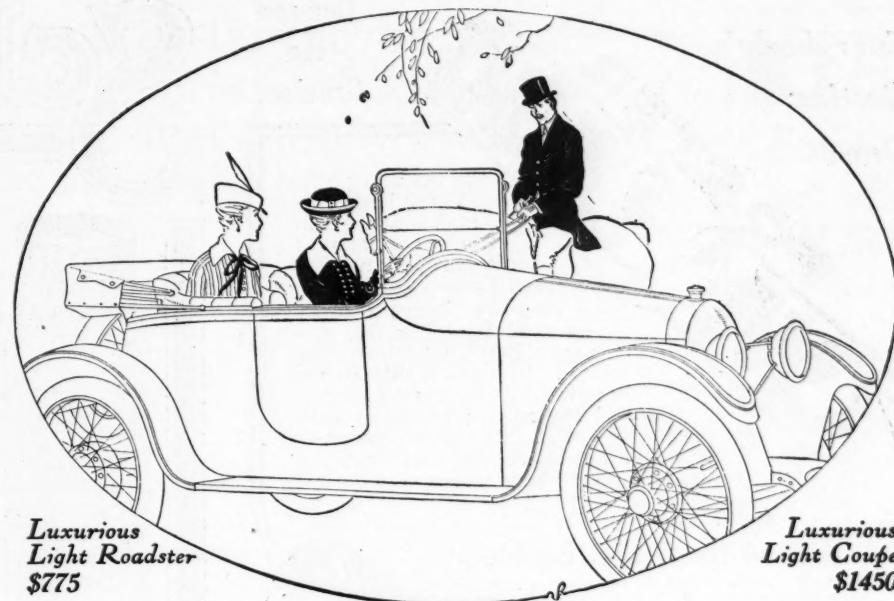
THE BRICTSON MFG. CO.  
1295 Brictson Bldg.,  
Brookings South Dakota

**Brictson Pneumatic Tires**

# Contrast

THE high-strung saddle horse or the light Brewster runabout of the old days finds its counterpart today in the light luxurious Scripps-Booth.

As the former were found in those families of station to whom the best appeals and were used to supplement the luxurious Victoria or Landau and pair, in similar manner the Scripps-Booth today for the same type of social environment performs its usefulness subsidiary to the limousine or touring car.



Owners of the highest priced big cars are most enthusiastic about the new luxury of this light motor vehicle and are the majority of Scripps-Booth owners. By noticing the type of buyer

whom you see driving Scripps-Booth cars you will best be convinced of the quality and value of the car.

Our dealers are for your assistance, and will appreciate the opportunity of a demonstration.



## Scripps-Booth Co. Detroit, Mich.

MAKE  
\$250<sup>00</sup> A MONTH REPAIRING  
AUTOMOBILE TIRES

Sounds like a lot of money—IT IS—A WHOLE LOT of MONEY to be earning CLEAR every month—yet it's what hundreds of men we have established in the Automobile Tire Repair Business are making. You let down the DRAW BRIDGE for SUCCESS to enter into your career by getting into business for yourself. The business for you is the one where investment is small—the returns quick and for cash—where the margin of profit is large—the demand for your PRODUCT or SERVICE constant and ever on the increase.

### A Haywood Tire Repair Equipment

tainty of success in this business is as sure as anything in this world can be—Each year adds thousands of new Automobile Owners—they need YOU to keep their tires in service.

#### Here Is Your Opportunity!

Be first to enter this new, big paying business in your town. Open your pockets. Let the dollars pour in. Act quick. Every auto sold means more tires to mend. Automobile business is growing fast—an enormous field for tire repairing. Punctures and blowouts are common. Tires need retreading and vulcanizing. Something going wrong all the time. Thousands forced to buy new tires because they can't get old ones fixed. Think of the old bicycle days—repair shops on every corner—all making money—busy day and night. Autos make same proposition over again—only ten times bigger and better. Users of Haywood Tire Repair Plants are making big money. Johnston, Tex., writes: "I have made as high as \$18 in a day." Another man who bought a plant September, 1911, writes he has cleared over \$3000.00. That's going some! Operate a plant as a side line in connection with auto business—garage or as an independent business besides transient work. Experience unnecessary. You learn quick. Simply follow directions—practice a few days on a couple of old tires and you'll be ready to coin money. Business comes fast and easy.

**HAYWOOD TIRE & EQUIPMENT COMPANY** 720 N. Capitol Ave. The New Money-Making INDIANAPOLIS, IND. Business—Start Now

answers to all of these requirements of Old Dame Fortune—the cer-

This Man is Making Money

#### Repair Tires At Home

Young men! and boys repair father's tires—get money he pays garage man. Get the neighbor's work. Make money to attend college or to start a garage and repair business. **Auto owners**—repair your own tires—save money—pay for your outfit in short time. We have outfits for home use. Anyhow, investigate. Send today for catalogue. See the wonderful possibilities in this marvelous field. Learn of the enormous money-making opportunities in this fascinating new business.



Everybody's  
Getting  
One!



Demand  
the  
Genuine!

Ask for the  
FOSTER Owl  
Light—and get it.  
Don't be satisfied  
with an imitation or  
substitute.

You can always identify  
an Owl Light by the patented  
FOSTER Universal  
Swivel. No other light can use  
this swivel. It is smooth operating  
and keeps the light in any position  
you put it. The worst jolts and  
jars will not cause the Owl Light to  
topple over and hang down way out of  
your reach when you need it in an  
emergency.

Send for FREE Booklet

Fastens to windshield or body of car. Operates from storage battery or dry cell. Handsomely finished in black with nickel trimmings. Price, \$9 complete, ready to put right on. In ordering, state make and model of car and battery voltage. Order through your dealer or direct.

Dealers and Jobbers  
Wanted Everywhere

C. H. FOSTER  
Mfr. & Distributor of  
Motor Car Accessories  
2303 Michigan Blvd.  
CHICAGO



\$9  
Complete

Demand  
this  
FOSTER  
Universal  
Swivel

## Wayside Cooking Made Easy

This handy, efficient little acetylene stove is ideal for the motorist who likes to get out in the open and enjoy a real meal by the roadside. You can make hot coffee, broil a steak or fry a mess of fresh caught fish. No bother at all; gets away from the trouble of hunting up dry sticks and building a fire, or carrying a cumbersome oil stove. The Auto Hot Plate is ready for instant use, with any automobile size

## PREST-O-LITE

**\$4.50**  
brings an  
Auto Hot  
Plate to you  
by parcel post  
prepared,  
packed in  
neat carton, 8x8x5. Weighs  
only 6 pounds.

### Camp Lighting

The Prest-O-Lite stem-and-burner (price 55 cents postpaid) furnishes a very convenient and efficient camp light, when used with any size Prest-O-Lite cylinder. If desired, cooking and lighting may be had together by using a special two-way valve union, price 75 cents extra.

**The Prest-O-Lite Co., Inc.**  
THE WORLD'S LARGEST MAKERS  
OF DISSOLVED ACETYLENE  
283 Speedway Indianapolis, Ind.  
Exchange Agencies Everywhere



Send for  
descriptive  
circular on camp  
cooking and lighting

When Writing to Advertisers, Please Mention Motor Age

# Schrader

**FREE**

AIR IS FREE—  
Rubber Costs Money—  
**RIDE ON AIR**

When the air in your tires  
falls below a certain pres-  
sure you no longer are rid-  
ing on air, but **on rubber**.

Measure your air with a

## Schrader

UNIVERSAL TIRE  
PRESSURE GAUGE

and save your tires.

Price, \$1.00

at your dealer's, or

**A. SCHRADER'S SON, Inc.**  
783-793 Atlantic Ave. Brooklyn, N. Y.



## Bull Dog Quality

Represents the difference between  
superiority in rubberized fabrics and  
the ordinary kind. When you want  
waterproof trimmings of quality, order  
Bull Dog.

Bull Dog Quality is made in double  
and single texture of Mohairs, Serges,  
and other attractive fabrics, rubberized  
together in a manner that has  
made Bull Dog Quality famous for  
waterproof trimmings for Automobile  
Tops, Curtains and Upholstery. Send  
for Samples.

**L. J. MUTTY COMPANY**  
BOSTON, MASS.

ACTUAL performance in the owner's hands is the best proof of Hassler superiority—50,000 satisfied owners swear by it—3 years' constant use on thousands of cars is proof of durability.

**HASSLER**

## Shock Absorbers For FORD Cars

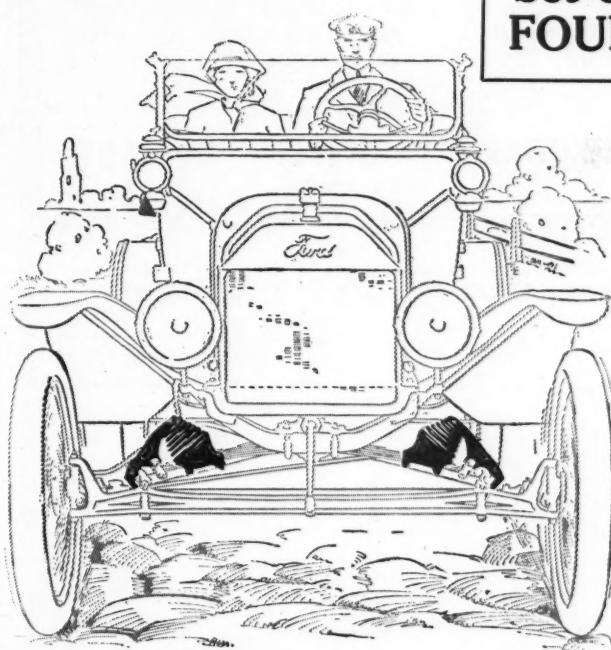
do more than absorb the shocks—they prevent the rebound, the tossing and side sway that is more dangerous and unpleasant than the initial shock. No other shock absorber does this. The protection afforded motor and tires is a great repair bill saver.

### As a Dealer

*you can't afford to overlook this most popular of all equipment for Ford cars. Sold under absolute guarantee. We want to send you a trial set. Not sold through jobbers. We protect you. Write today.*

**Robert H. Hassler, Inc.**  
Indianapolis Indiana

**\$15**  
For a  
Set of  
FOUR



**SPLITDORF**  
COMMON SENSE  
SPARK PLUGS



The very simplicity in constructive details of SPLITDORF PLUGS strongly appeals to the leading motorists. A core easily accessible for cleaning and yet absolutely gas-tight is a distinct feature.

Overland, Franklin and Jeffery are prominent cars equipped with SPLITDORF.

**SPLITDORF**  
ELECTRICAL CO.  
NEWARK, N. J.

*(All SPLITDORF features are fully covered by patent or patents pending)*



**A motorist's friend when in and out of trouble**

There are times when you have to get down and get under, change tires, grease or clean your car. You disregard your clothes while doing the work, but you cannot feel comfortable with dirt and grease spots all over you. Think of the convenience when having a

### Shanhouse Motorsuit

in your tool-box. A one-piece garment made of high grade olive khaki, roomy and comfortable. Slip it on in a moment when necessary and you are covered from head to foot. No dust, dirt or grease can reach you. Saves your clothes and disposition. You can't afford to be without one.

The original Motorsuit bears the Shanhouse label and our guarantee. Take no other.

If your dealer doesn't carry it, send \$2.00 for one prepaid. Give chest measurement and leg length. Money back if not entirely satisfactory

**The Shanhouse Co., Rockford, Illinois**



## These Specifications Tell Their Own Story

Roomy Tonneau. Flush Type Doors and Concealed Hinges. Superb Finish. Genuine High-Grade Enamored Leather Upholstery. Goodyear Demountable Rims. Goodyear 34x4 No-Rim-Cut Tires—Non-Skid on Rear Wheels. Rutenber High Duty Motor, Six Cylinder, 3x5. 12-Plate Dry Multiple Disc Clutch. Spicer Dust-Proof Self-Oiling Universal Joints. Tubular Propeller Shaft. Spiral Bevel Driving Gears. Pressed Steel Rear Axle Housing. Brown-Lipe Differential. Hotchkiss Drive. Crowned Fenders. Rim Type Tire Carrier.

Unit Power Plant. Two-Bulb Headlights—Conforming With City Ordinances for Dimming. Linoleum-Covered Runboards. Storage Battery Under Footboard. Brown-Lipe Transmission—Aluminum Case. Stewart-Warner Vacuum Gasoline Feed System. Westinghouse Ignition System. Westinghouse Starter—Bendix Drive. 18-Inch Corrugated Walnut Steering Wheel. One-Man Top. Jiffy Curtains. Rain-Vision Windshield—Integral With Body. Wheel Base 119 Inches. Weight 2600 Pounds. Price \$1095 f. o. b. Peoria.

1916  
*Glide*  
Light Six  
"40"  
\$1095

The Bartholomew Co., 215 Glide St., Peoria, Ill.

## SMALL, BUT STRONG

When somebody says "Autowline," don't think of a great big rope. Think of Basline Autowline. This handy tow line is about 25 feet long, four and a half pounds weight and no larger than a lead pencil. But—when



### Basline Autowline

sets out to tow a crippled car home, or to pull a wrecked one out of a ditch, the job is as good as done. BASLINE AUTOWLINE is a little bundle of nervy Yellow Strand Powersteel wire rope that attaches or detaches with its patented snaffle hooks in a moment's time. Motorists call it "The little steel rope with the big pull." Have you got one? If not, you'd better "play safe" right now. Any supply dealer will take your coin. In convenient patented package; price, east of Rockies, \$8.95. POWERSTEEL TRUCKLINE is Basline Autowline's "big brothers" for heavy touring. Saves time and loss in commercial hauling. Price, east of Rockies, \$6.50. If your dealer cannot supply you, order from us direct. POWERSTEEL AUTOWLOCK is a proposition the auto-thief can't negotiate. All dealers, \$2.00.

FREE  
about these necessities.

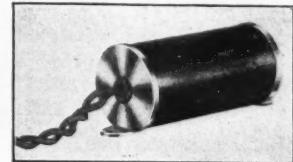
BRODERICK & BASCOM ROPE CO.  
813 N. 2nd St. St. Louis, Mo.  
New York Office, 76 E. Warren St.  
Makers of famous Yellow Strand Powersteel wire rope.



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## EVENLITE

F O R



Pats. Pending

F O R D  
C A R S

\$ 3.50

St. Louis Electrical Works  
Arlington and Easton Aves. ST. LOUIS, MO.  
Manufacturers  
St. Louis Battery Chargers and Magnetizers

"Just as good as a storage battery light without the bother or expense of recharging."

This is the comment of all those who have installed the EVENLITE.

It is for the 1915 Ford and sells complete with lamps at the above price.

Simple and can be installed in 15 minutes. Write for particulars.



1916 MODEL  
METZ "25" ROADSTER

## METZ

1916 models. Price, \$600 each, completely equipped. Both Roadster and Touring Car built on same chassis, 108-inch wheel base, and carry identical equipment, including electric starter and electric lights, 25 h. p. water-cooled motor, large wheels and tires, rain-vision windshield, instant one-man top, speedometer, built-in gasoline gauge, signal horn, etc. Write for DEALER particulars and new illustrated catalog "K."

METZ COMPANY, Waltham, Mass.



1916 MODEL, METZ "25" TOURING CAR

## FREE ROAD MAPS

New England States  
New York State  
New Jersey

Pennsylvania  
Southern States  
Middle Western States

Transcontinental, Showing All Trails

These maps were prepared for us by the Automobile Blue Book Company.

Copies may be obtained from any dealer displaying the sign with the orange disc, or mailed on request.

There is More Power in  
THAT GOOD GULF GASOLINE and  
SUPREME AUTO OIL

GULF REFINING COMPANY

Dept. 1875 Frick Annex

PITTSBURGH, PA.

THE FAULTLESS  
10%  
CORASCO  
MORE  
POWER  
CARBON DECOMPOSER

100% EFFICIENT

Sample Can \$1.00, Express Prepaid

CARBON REMOVER SALES CO.  
Syracuse, New York  
Sole Distributors

**Polarine**  
FRICTION REDUCING MOTOR OIL

Maintains the correct lubricating body at any motor speed or heat

STANDARD OIL COMPANY

(AN INDIANA CORPORATION)

**SALISBURY**

AXLES WHEELS  
PROPELLERS

Salisbury Wheel  
& Mfg. Co.  
JAMESTOWN, N.Y.

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Established  
Agents Solicited

## BRAENDER

TIRES and TUBES

are famous for their QUALITY

We wish to announce that irrespective of action by any other organization

Braender Quality Will be Maintained

Braender Net Prices to Car Owners

Tires.	Plain.	Non-Skid.	Gray Tube.	Red Tube.
30x3	9.00	10.35	2.35	2.60
30x3 1/2	11.60	13.35	2.70	3.00
36x4 1/2	27.35	31.45	5.20	5.80
37x5	32.30	37.15	6.30	7.00

BRAENDER RUBBER & TIRE CO.

Main Office & Factory, RUTHERFORD, N. J.  
New York, 250 West 5th Street  
agents in principal cities

## Own the vulcanizer you're paying for

Yes, paying for it in  
repair bills and tire service  
that you don't get. You  
buy two tires where one  
would do as well.

**SHALER**  
Vulcanizer



Mends tubes and casings perfectly. You or your chauffeur can use it. Prices \$2 and up. One free copy of "Care and Repair of Tires" if you write at once. Tells what you need to know about tire-saving devices. C. A. SHALER CO., 235 Fourth St., WAUPUN, WIS.

1916

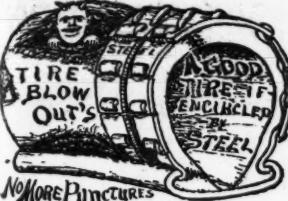
\$850



Same Car  
New Price

Touring &  
Roadster





## Steel Protectors

Each section  
2" wide  $\frac{1}{8}$ "  
thick. They hook to rim. As flexible as  
ever. Anti-skid, can't blow out or rim  
cut.

**HOW CAN THE RUBBER WEAR OFF  
IF IT IS COVERED WITH STEEL?**

Try 2 or 3 sections over any old blowout  
Special prices to the first in new territory

**Kimball Tire Case Co. 173 Council Bluffs, Ia.**



Tire covered  
complete

**The United States Motor Truck Co.  
CINCINNATI, OHIO**  
OFFERS A FINE OPPORTUNITY TO DEALERS

*Get Our Proposition*

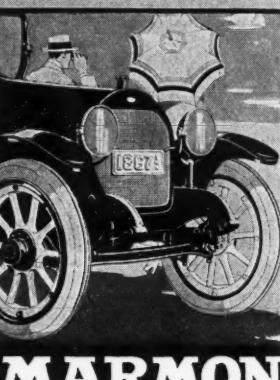


FLEXIBLE and  
DURABLE  
Economical  
and  
Powerful



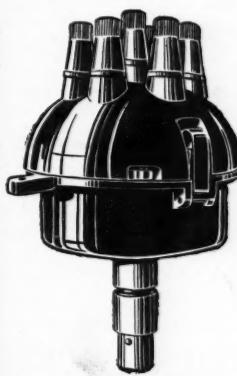
**MADE IN 2, 2½, 3 AND 4 TON CAPACITY**

The correctness of its construction combined with best quality ma-  
terials and right prices, make the U. S. Truck a splendid value for  
buyers and a money-making proposition for dealers.  
Specifications and prices on request. Address Contract Dept. B.



**MARMON**

Write for complete  
details of new series  
**MARMON "41"**  
Nordyke & Marmon Co.  
Indianapolis, Ind.



*The*  
**Atwater Kent  
Ignition System**

Used by one-quarter of all  
1915 U. S. A. built cars,  
exclusive of Fords.

4934 STENTON AVENUE  
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**Limousine Tops for Ford Cars**



Fits  
1913-14-15  
Touring Car  
Perfectly

Winter driving  
isn't very com-  
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has a limousine,  
he usually stores  
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lose from 3 to  
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pleasure when you can buy a limousine top so reasonable? This limousine  
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Duty Service on Motor Trucks  
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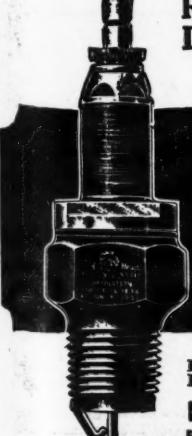


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**K**NOW the world over as  
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A precision instrument giving  
permanently, exact carburetion  
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**PLAIN, "WM"  
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Thoroughbred Six—\$1875  
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Equipped with Moore Multiple Exhaust System

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RADIAL RETAINERS

MADE IN AMERICA

Manufacturers of Star Radial Ball Retainers, Star Ball Thrust Retainers, Star Complete Ball Thrust Bearings

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Chain and  
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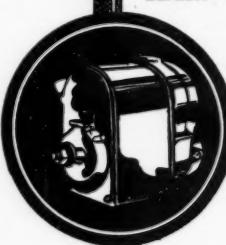
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Send for booklet B 30, describing all capacities.

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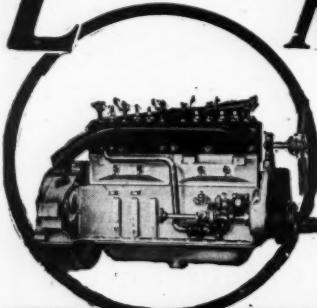
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The most simple—the most accessible—the most durable—the most efficient magneto ever produced is the new Type G-4.



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 112 inch wheel base. Electrically started and lighted.

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**\$1000.00** for Best  
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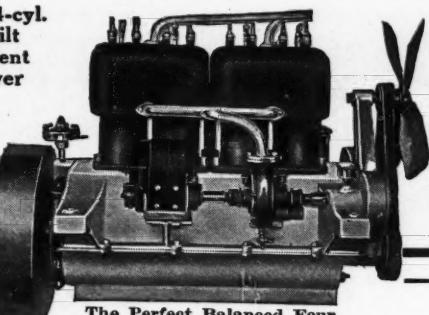


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GAS, OIL, AND ELECTRIC  
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**Model B—4-cyl.**  
4½x5. Built  
as independent  
or unit power  
plant.

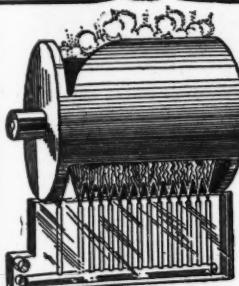


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will give you the maximum efficiency from that engine—power, speed and fuel economy. Its simple construction eliminates adjustment, and makes your carbureter trouble a thing of the past.

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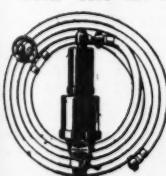
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But you will enjoy pumping tires with a

### MAYO SPARK PUMP

Simply substitute the pump for any convenient spark plug. The motor does the work—lets the motorist out.



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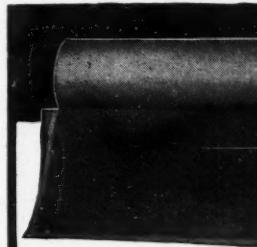
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Bridgeport Brass  
Company  
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Bridgeport  
Pumps



**4-Cyl.  
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4x5  
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4½x5  
Model 11  
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Men who repair their own tires find the Goodyear Tire Accessories tremendously efficient. For example, Goodyear Repair Fabric is heavy Egyptian fabric, impregnated with fine quality friction.

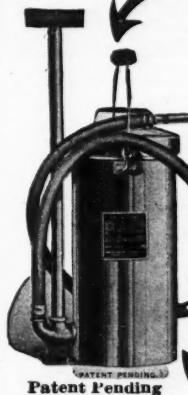
Four features have made it the largest selling fabric in the world. It is made of long-fibre cotton, giving utmost strength and durability. It passes rigid inspection for flaws or defects. Only the highest grade friction is used—nearly pure gum. And then the fabric is calendered. Yet the price of this Goodyear Fabric, because of enormous production, is no higher than for fabric of lesser worth.

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AKRON, OHIO

THE GOODYEAR TIRE & RUBBER CO., AKRON, OHIO  
Makers of Goodyear Fortified Automobile Tires (2635)

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PATENT PENDING

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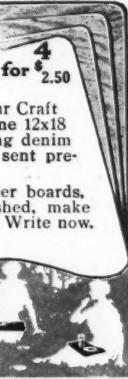
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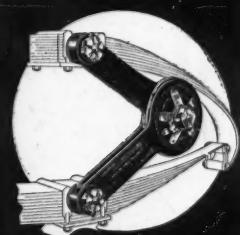
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COATES CRAFT  
COMPANY  
Wausau, Wis.  
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### \*Hartford SHOCK ABSORBER For Comfort, Safety, Economy.



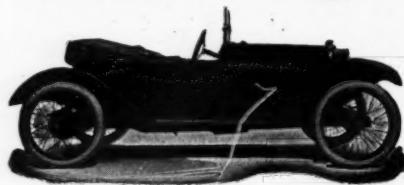
Stops jolting, jarring and vibration. Eliminates side-way. Contributes to solid auto comfort. Prevents spring breakage. Makes tires last longer. Cuts cost of maintenance. Insures longer life for your car.

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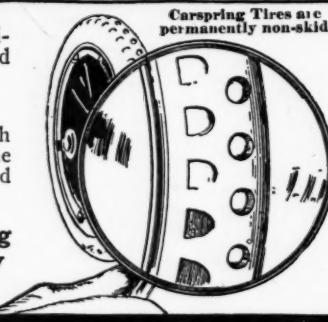
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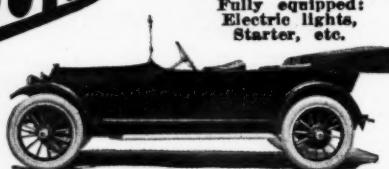
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Carspring Tires are  
permanently non-skid

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50 Per Cent  
Increase



Four - - - \$ 985  
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Fully equipped:  
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Make Heinze the Better Magneto

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Enlarged—Revised Edition  
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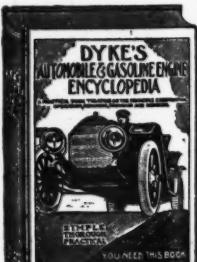
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USED FOR  
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Manufactured by  
THE ROYAL EQUIPMENT COMPANY  
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finished in  
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Complete repair department for all makes. We return work promptly and itemize all jobs estimated when required. Klaxon Service Station. **S. G. HOFFMAN MAGNETO CO.** 3937-39 Olive St. St. Louis, Mo.

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—but we repair anything electrical if it can be repaired.

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**ANYTHING AND EVERYTHING FOR THE AUTOMOBILE**  
 6-cylinder 45 H. P. Beaver motors complete with clutch and transmission \$190.00  
 Special high-grade Speedster Bodies, upholstered with genuine leather 50.00  
 Fore Door Roadster Bodies, genuine leather 55.00  
 Fore Door Touring Bodies \$25 to 75.00  
 Delivery and Truck Bodies of all descriptions 75.00  
 Special Speedster Seats, per pair 16.00  
 Radiators, large assortment 22.00  
 Five-passenger Silk Mohair Tops 18.00  
 High-grade electric lamps, 11½", black and nickel finish, special 5.50  
 Frames, Springs, Axles, Windshields, Cushions, etc., etc. Our big general catalog is yours for the asking.

**THE M. & M. COMPANY**  
 480-500 Prospect Ave., Cleveland, Ohio

## Auto Suggestions

Save money by trading where prices and value are considered

Stationery Type "Victor" Vises

Value	Size	Sale Price
\$ 6.00	3½"	\$3.00
8.00	3¾"	4.00
9.00	4"	4.50
10.00	4½"	5.00
12.00	5"	6.00
18.00	6"	9.00

Blacksmith Vises and Pipe Vises at Bargains

## PURITAN TRAILERS

Model "J" .....	74.89
Model "C", capacity 1200 to 1500 lbs. 60.00	99.85
Radiator Hoods and Hood Supports (Packard Style) .....	30.00 up
16.00 Truck Radiators (4 and 6-ton) .....	80.00 up
15.00 Spark Plug Power Pumps .....	6.50
35.00 6-Volt Lighting Generators, each .....	17.50
15.00 Jacox and Gemmer steering gears (right and left hand drive) .....	7.50
Control Assembly, each .....	3.50
Mufflers (all sizes), each .....	1.00
Splash Guards, pair .....	1.00
Dashes, each .....	.75
32x3½ Det. Dem. Rims (for Dunlap straight side tires), each .....	1.50
Four 36x4 Firestone Universal wheels and 5 rims .....	21.00
Drag links, each .....	1.50
Locking rings (all sizes) .....	.50
14" Bennett carburetors, each .....	4.00
Dash ventilators, per pair .....	.50
Silent chains for all cars, per ft .....	.60
Brass running board moulding, per ft .....	.03
Nickle plated foot rails .....	.35
Diamond repair outfit, No. 6 .....	.50
5-pass. bodies in the rough .....	25.00
Running boards, per set .....	3.00
Windshields (clear vision), 37x23 .....	6.00
Springs, all sizes .....	2.00 up
Bosch, 6-cyl. magnetos .....	35.00
Tops, Cadillac tops (all models with side curtains) .....	17.50 up
5-pass. touring car tops from \$10.00 to 15.00	
Tops for most all makes at big reductions .....	
Fenders to Fit All Cars—Bargain Prices	
Garages, Puritan Permanent Portable Garages, 10x14 ft., wood .....	62.50
10x18 ft. wood .....	75.00
9x16 ft., all steel burglar proof .....	100.00

"Deaco" Systems for Fords—Famous "Deaco" starting and lighting systems complete with lamp, battery, cut-out, switch, wiring, etc., former price, \$85.00, our price .....	55.00
Horns—large assortment of electric vibrating horns .....	2.00 up
Spark Plugs—Champion, each 39c, 3 for .....	1.00
Mosler, each 19 cents, 6 for .....	1.00
Transmissions—3 speeds ahead and one reverse, complete with control levers .....	40.00
Gasoline tanks, square, many sizes, round, 12x30", oval 11x30x15" from.	1.00 up
Auto Lamps—electric head lamps, black and nickel, pair .....	5.00 up
Electric side lamps, black and nickel, pair .....	2.25 up
Gas head lamps, black and nickel, pair .....	3.50 up
Electric tall lamps, black and nickel .....	1.00 up

Write for bargain catalog

## PURITAN MACHINE CO.

"The Auto House That Dunk Built"

410 Lafayette Boulevard

Detroit, U. S. A.

ALL PARTS FOR ALL CARS

## A SPECIAL FOR FORDS EVERREADY Automatic Engine Starter Spins Your Motor

Write for Illustrated Circular  
 General machine work for foreign and American cars. Welding of all metals. Manufacture Catelein Hose Coupling.

**ANDRE G. CATELAIN**  
 1446-8 Indiana Ave. Chicago, Ill.

## ATTENTION

Give Us a Chance to Save You Money.

### Notice the Following Bargains:

Car-Nation 4-pass. bodies, not upholstered	\$16.00
Krit gasoline tanks, 29x18x8	2.00
32x3½ clincher casings	10.00
32x4 clincher casings	14.00
Car-Nation, 30x3 wire wheels	3.50
Car-Nation, set of five	15.00
Auxiliary seats	7.00
Child's fire extinguisher, factory size	6.00
Krit radiators	13.50
30x3 wheels for Ford	1.50
30x3½ wheels for Ford	2.00
Savage truck radiators	15.00
"DeLuxe" 2-cyl. V type motors with Atwater Kent ignition	40.00
Keeton transmissions	75.00
Weston-Mott three-quarter floating axles	45.00
Krit wire wheel hubs, front	1.00
Krit wire wheel hubs, rear	1.40
Wall 5-pass. bodies, not upholstered, 38" wide and 89" long	25.00

Write for catalog.

**U. S. AUTO SUPPLY CO.**  
 859 Woodward Ave. Detroit, Mich.

## AUTOMOBILE PARTS

3 speed transmission \$35.00. 40 H. P. Overland motor \$90.00. 35 H. P. Milwaukee motor \$75.00. B Presto \$10.00. 6 cylinder, 70 H. P. T head motor \$150.00. 20 H. P. Thomas motor with high tension magneto \$50.00. 25 H. P. Stoddard-Dayton motor, complete \$90.00. 25 H. P. Mitchell \$50. 2 spark Spaldorf magneto \$30. B-K Mea \$25.00.

### AUTO SALVAGE CO.

1436 Wabash Ave. Chicago, Ill.

## AUTO SALVAGE CO.

1418 Main St. Kansas City, Mo.  
 Buick 10, E. M. F., Flanders, Winton, Overland, and Regal 30. Parts a Specialty. Motor parts and accessories for almost any make of car

Write Us Your Needs

## AUTO SEAT COVERS

**AUTO TOPS AUTO CUSHIONS TOP DUST HOODS**

For all makes of cars. Sit right down and write for our samples and price list. Best Materials High Class Workmanship. We maintain a separate department for repairs

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 1913-1933 Harney St. Omaha, Neb.

**AUTOMOBILE TOPS**  
 Mohair Tops, runabout, \$20.00; touring, \$30.00  
 Racing Seats, per pair, \$15.00

**AMERICAN AUTO TOP MFG. CO.**  
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**Auto Tops Bodies and Seat Covers**  
 Hand made. We make a specialty of one man tops with Jiffy curtains. Write for prices.

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## BATTERIES

Limited Sale—New six-volt starting batteries, value \$20.50. Now \$15.00.

**THE AMPVO BATTERY CO.**  
 3031 Michigan Ave. Chicago, Ill.

**Belfast Bucket or Racing Seats**

Well made and attractive in appearance. Prices low. Discount to dealers and jobbers.

**BELFAST MFG. CO.**  
 Dept. M. Cincinnati

# The Clearing House - continued.

## BALL BEARINGS REGROUND

One Firm      One Service  
One Guarantee

Back of Every Bearing Ground by

**Ahlberg Bearing Company**  
2636 Michigan Avenue  
Chicago, Ill.

New York      Cleveland  
Boston      Detroit  
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**BIG DEALS** enable us to sell parts and accessories at exceptionally low prices. Bargain Bulletin on request.

**Progress Auto Parts Co.**  
1511 Prospect Ave.      Cleveland, O.

### BODIES FOR FORD CARS

Commercial bodies guaranteed to fit Model "T" Ford. Bucket seats not painted or trimmed, \$5.00 per pair. Trimmed and upholstered backs and cushions, \$15.00 per pair. We also build a full line of Speedster bodies complete; also Ambulance and Undertakers' cars all for Ford chassis. Send for our catalog. Agents wanted everywhere.

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### Bucket Seats

Racing Bodies      Delivery Bodies for Fords  
AUTO REMODELING CO.      Chicago, Ill.  
1503 Michigan Avenue

Cocoa and Carpet Mats, Hand Made Seat Covers, Auto Tops Built and Repaired

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## DEALERS AND OWNERS

You need our catalogues on accessories and supplies. Best prices on following specials for Ford cars—tops—racing bodies, demountable wheels, radiators, lamps, springs, and everything to make the old Ford up-to-date.

Radiators and Baker Rims for Buick cars—all models.

**SPECIALS THIS WEEK**  
Bosch DU4 Magneto.....\$30.00  
Model "B" Prest-O-Lite Tanks... 10.00  
Model "E" Prest-O-Lite Tanks... 8.00  
Champion "X" Spark Plugs, Each. .39  
Stewart Speedometer Cables..... 1.25  
Splitdorf Kick Switch Coils..... 6.00

**Automobile Specialty Company**  
999 Woodward Avenue  
Detroit, Michigan

### DEALERS:

Gasoline gauge for Ford. Accurate, registers in gallons. Always in view. Price \$1.00. Sample sent any place in U. S. if you send 60 cents.  
**HENES SALES CORPORATION**  
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**F. & H. WIRE WHEELS**  
Equipped with F. & H. Special Wire Wheel Rims. Adaptable to any car. Complete equipment for Ford cars.

**THE F. & H. WIRE WHEEL CO.**  
Springfield, O.

## Early Birds Catch the Worm

Early buyers get the bargains. One more week to take advantage of our special sale. Send your order now.

Fuller Fenders (Model F), per set.....	\$ 5.00
Garage Fire Extinguishers (worth \$25).....	6.00
EZ Presto Gas Starters (4-cyl).....	2.95
Dash Boards (mahogany veneered), 24x38.....	1.00
Packard Secondary Cable (ignition)..... feet for.....	.25
Hyatt Roller Bearings, 2 1/4 x 3 1/4 x 2" high.....	.70
Stepney Spare Wheels, 34x3 1/4 and larger.....	1.00
Corrugated pressed steel running boards, 44 1/2 x 8, each.....	1.00
Nickel valve stems, 2 1/4" head, 6 1/2" long.....	.20
Underslung 7-pass. bodies (no doors).....	5.00
Cyclecar 2-pass. bodies, 72x25.....	3.50
Pressed steel frames, 150" long, 32" wide.....	7.00
Square gasoline tanks (ass't sizes).....	1.25
Buick hoods, 30 1/2" long, each.....	.50
Krit hoods (send sketch with order).....	8.00
32x3 1/2" wheels (with metric rims), each.....	.50
36x3 1/2" wheels (Marsh rims), each.....	.50
36x4 wheels (Marsh rims), each.....	.75
American 38x3 1/2" Q. D. clincher rims, each.....	1.00
Fireside 36x3 1/2" Q. D. clincher rims, each.....	1.00
Scroll elliptic springs, 87 1/2 x 2x6 leaves.....	3.25
Style A differentials, 9 1/2" dia. flange.....	3.00
Deal foot pedal assemblies.....	.75

### BARGAINS IN REGULAR STOCK USED MOTORS

Cadillac 4-cyl, 4 1/2 x 5 1/2, 40 H.P.....	75.00
Rambler, 4-cyl, 35 H.P.....	65.00
Rutenber, 4-cyl, 30 H.P.....	75.00
Oswald, 4-cyl, 25 H.P.....	85.00
Kril 1918 Unit Power Plant.....	135.00
Thomas 60 H.P. fitted with Bosch Magneto and Stromberg Carburetor.....	150.00
Kermath, 4-cyl, 3 1/2 x 4.....	150.00
Ohio 4-cyl, 35 H.P., 4x5.....	100.00
Everitt, 6 cyl, 48 H.P.....	200.00
Yankee Unit Power Plant, 12 to 15 H.P.....	180.00

### NEW MOTORS

Mighty Michigan, 40 H. P.....	135.00
Marion, 35 H.P., with crank and pump.....	115.00
Buda Croxton, 4 1/2 x 5 1/2.....	125.00
Kril 1915 Unit Power Plant with Remy Unisparker, carburetor, fan, pump, plugs, levers and pedals.....	175.00
Sterling Unit Power Plant, 18-20 H.P. overhead valves, center control, with unisparker, and carburetor.....	175.00

### REAR AXLES

Weston-Mott full floating, complete.....	85.00
Weston-Mott semi-floating, complete.....	45.00
F. A. L. semi-floating, 3 1/2 to 1 ratio.....	50.00
Car-Nation semi-floating, complete.....	25.00

### FRONT AXLES

Weston-Mott, 28 1/2 centers, complete.....	18.00
Elmore, 30" centers, complete.....	14.00
Car-Nation (tubular), complete.....	10.00

### WHEELS

30x3 (clincher rims) to fit Fords, each.....	1.50
30x3 1/2 (clincher rims) to fit Fords, each.....	2.00
32x3 1/2 Overland (Standwell rims), each.....	4.00
34x4 with Goodyear demountable rims, each.....	5.50
28x3 wire with bearings—fronts.....	1.50
Rears.....	2.00

### RACING SEATS

Leather upholstering, spring cushions.....	25.00
Imt. leather upholstering, hair stuffed cushion.....	17.50
Mohair upholstering, leather trimmed.....	14.00

You can get all parts and supplies of the auto from us. If you don't find it here, write, specifying your needs, and we will help you make a selection.

We also manufacture tops, radiators, fenders, splash aprons, mud pans, gears, and racing seats.

**GET OUR PRICES BEFORE BUYING**  
Dept. M. 92

**AUTO PARTS COMPANY**  
737 W. Jackson Blvd.      Chicago, Ill.

### Ford Dealers and Owners

We manufacture tapered axles for Fords of a particularly tough steel and are the only manufacturers who guarantee that the axles for Fords which we furnish will not crack out in the keyseats for a period of one year, each axle being stamped with the date at time of shipment.

Price, \$2.50.

Dealers, regular discounts.

We also manufacture Spring Radius Rods, Radiator Cradles, Kant Kum Off Belt Holders, and the celebrated "Angiers Spare Demountable Wheel" for the Ford car.

"ANGIERS"

Streator, Ill., U. S. A.  
Agents wanted for our lines

### FOR FORDS

#### The M-G Front Axle Brace and Shock Absorber

is a necessity, not a luxury. Made of high grade spring steel. Positively prevents bending or breaking of radius rod. Makes car steer and ride better. Sold under a money-back guarantee.

**MONNICH-GAYLORD CO., Hooper, Neb.**

### GET OUR PRICE LIST

Just off the press—with special prices on complete line of auto parts and supplies.

**Chicago Auto Equipment Co.**

808-10 W. Jackson Blvd.      Chicago

## KOMFORT Shock Absorber

Saves jolts, jars and vibrations and furnishes the very object of motoring—Comfort.

Adds longer life to all parts of your car by preventing sudden expansion and contraction of springs.

**Price \$40.00      Discount 50%**

Agents Wanted Everywhere

**DUNK & GREMEL, Distributors**  
59 Tenth Street      Detroit, Mich.

### MAKE YOUR CAR NEW

It pays to keep your car well painted. You can do it yourself and save money. Our instruction book makes it easy.

**GIDDEN PAINT CO.**

7412 Indiana Ave.      Cleveland, O.

### Motor Bargains

25 H. P. Unit Power Plants.....	\$140.00
Engines only.....	100.00
30 H. P. Unit Power Plants.....	170.00
Engines only.....	125.00
40 H. P. Unit Power Plants.....	200.00
Engines only.....	155.00
55 H. P. Engines only \$250.00.	
All Four Cylinder Four Cycle.	

### Bargains for Quick Sale

**Pittsburgh Model Engine Co.**  
Pittsburgh, Pa., and Peru, Ind.

**ONE NEW 35 H. P. MOTOR**, complete, \$100.00. One raceabout, running gear, wire wheels, tires and frame, axles, radiator, complete, less motor, \$150.00. **SPENCERVILLE GARAGE**, Spencerville, Ohio.

**PACKARD ROADSTER**, body with variations to fit phaeton chassis. Equipped with seat covers, top, rear fenders.

**A. R. K., P. O. Box 416, Wausau, Wis.**

### PLEASURE BODIES FOR FORDS

New 1915 cowl dash Touring and Roadster Bodies for Fords at prices that appeal. Get our prices before buying. **LONDON AUTO SUPPLY CO.**, 2548 Wabash Ave., Chicago.

# The Clearing House—continued.

# MOTORS

Franklin, 4 cyl., 4 x 4½.....	\$ 40.00
Flanders 20, 3 speed.....	75.00
Continental, 30 H. P.....	75.00
Oswald, 4 cyl., 4 x 4½.....	75.00
Moon, Model C, 4½ x 5¼.....	75.00
Stoddard Dayton, 8-K, 4¾ x 5¼.....	75.00
Regal 30, 4 x 4½.....	75.00
Bergdoll, unit power plant, 3¾ x 4½.....	150.00
Jackson, unit power plant, 4½ x 4½.....	150.00
Franklin, 6 cyl., 3½ x 4.....	175.00

Above are used motors, guaranteed to be in good shape. Will take other motors in on trade.

Write us for further particulars

**AUTO WRECKING CO.**  
13th and Oak Kansas City, Mo.

## MUST HAVE ROOM

Closing Out Bodies, Motors, Etc.	
Cadillac 1914 touring bodies.....	\$75.00
Krit 1914 bodies, roadster.....	35.00
Touring.....	45.00
Studebaker six-cyl. 1915 bodies, 5-pass.....	65.00
1912 E. M. F. 30 touring, 1913 Studebaker 25 touring and 1913 Studebaker 25 roadster, each.....	50.00
Round gasoline tanks, upwards from.....	2.00
Cadillac fenders, each.....	3.00
Maxwell Crown fenders, each.....	2.00
Splitdorf magnetos.....	9.00
Splitdorf Model D coils.....	6.00
Splitdorf Model X coils.....	8.00
Studebaker 25 and 35 radiators.....	15.00
Studebaker 25 motor, electric starter and generator.....	125.00
Studebaker six-cyl. motor.....	125.00
E. M. F. parts for sale.	

**NICHAOLDS CO.,**  
Detroit, Mich.

## Paint Your Car Yourself

Save \$25 to \$75 by doing the work at home with the Arsenal system. Our big free booklet, "The Car Beautiful," tells how. Send for it today.

**Arsenal Varnish Company**  
Auto Dept. Rock Island, Ill.

**RACING BODIES AND SEATS**  
for all chassis—guaranteed to fit.  
Fenders, Hoods, Tanks, Radiators  
**STANDARD AUTO SHEET METAL WORKS**  
532 So. Canal Street Chicago, Ill.

**RACING SEATS**  
**SPEEDSTER BODIES**  
All equipment for changing your car to a Speedster  
Bodies, Tanks, Hoods, Cowls, etc.  
**CHICAGO AUTO BODY CO.**  
1627 Michigan Ave. Chicago, Ill.

**RADIATOR BARGAINS**  
Model T honeycomb, V-shaped, for Ford. \$22.50  
Buick 16 and 17..... 33.50  
Buick 10..... 20.00  
Hudson 20, 32 and 33..... 28.50  
Chalmers 30..... 30.00  
Cutting, Models A and B, 40 and T 35..... 30.00  
Colby, Models 40 and 50..... 30.00  
Rambler radiators all models..... 26.00  
Write for prices on other makes

**AUTOMOBILE APPLIANCE CO.**  
1436-38 So. Michigan Ave., Chicago, Ill.

**RECTIFIERS**  
to charge from A-C circuit 1 to 8 ignition, lighting or starting batteries at one time; \$12 and upwards. **AMERICAN BATTERY CO.**, 1124 Fulton St., Chicago.

## Radiator Bargains on STUDEBAKER 25 & 35 MODELS

We are offering for cash, while they last, these popular radiators. They are all new, black enamel finish, fin and tube construction.

Price \$16.00 each f. o. b. Detroit  
**Detroit Radiator & Specialty Co.**  
963 Woodward Ave., Detroit, Mich.

## Radiators

**At Lowest Prices in the United States**  
Plain to fit Ford cars..... \$18.00  
"V" shaped to fit Ford cars..... 20.00  
Buick 10 (give year)..... 19.50  
Hudson 20..... 28.00  
E. M. F. 80..... 28.00  
Hupmobile 20..... 21.25  
Oakland 1911..... 28.50  
Overland 59-69-T-40-82..... 30.25  
Regal MT Unterslung-M-20-FL-MS..... 30.25  
Studebaker 35..... 30.00  
Plain or "V" Shape Radiators for Any Car, If Your Car Is Not Listed Write for Special Quotations.

Dept. M 92

**AUTO PARTS COMPANY**  
737-39 W. Jackson Blvd. Chicago, Ill.

## RIMS—ALL MAKES AND TYPES

Parts for all old types, including Goodyear '7. Largest distributors. Dealers—Write for Prices.

**CITY AUTO TIRE & SUPPLY CO.**  
2352 Euclid Avenue Cleveland, Ohio

## RIMS—ALL NEW AND OLD TYPES

and all necessary parts. Special price this month only on 38x4½ Continental No. 3 Split Rims. State make and year of car, also style and tire size when ordering.

**W. P. KASTNER, 2125 Michigan Ave., Chicago**

## ROADSTER BODIES FOR NEW 1915 FORDS

These bodies include new cowl, top, cushions, side curtains, slip cover, floor boards, rubber mat, dash and hood support, windshield, rear round fenders and irons, 2 side lamps and tail lamp. Complete, \$65.00 f. o. b. Detroit, crated. Fit any Ford chassis from 1912 up.

**JOHN C. NAGEL**  
425-33 Baker St. Detroit, Mich.

## Save Your Old Tires

By Using

## "KUTFILLER"

Positively fills up any cuts or other injuries in the tire. Self vulcanizing. No heat required. Any child can apply it. Solidifies over night.

¾ lb. can, \$1.25

SEND FOR A CAN TODAY  
Satisfaction Guaranteed or Money Refunded

## S. V. Rubber Works

Morristown New Jersey

**SHIP THAT TROUBLESONE CARBURETOR** by Parcel Post. We rebuild and install new parts. Factory testing methods used. Service Station for Rayfield, Schebler, Stromberg and Holly. All work guaranteed. **Wills, Carburetor Specialists**, 358-360 Belleville Ave., Newark, N. J.

## Specials for Ford Cars

Driving gears 1½" nickel, pair..... \$ 6.50  
Nickel steel 8:1 ratio racing gears, pair..... 10.00  
Racing seats 16" wide, 21" high, pair..... 18.00  
Gas starter and primer, each..... 8.10  
Crown fenders for Ford Cars, set..... 18.00  
30x3½ clincher wheels, new, each..... 2.75  
30x3½ demountable wheels, extra rim, set 14.25  
Steering gear for Ford, 60" long..... 12.00

**R. C. AUTO PARTS CO.** 1827 McGee St. Kansas City, Mo.

## You're Losing Money If You Are Not Buying Accessories

From Us. We Are  
the World's Largest Dealers  
and Sell 25 to 50 Per Cent Below  
Others

Look this list over and see how much lower our prices are than those of other concerns. Send us your order and save money.

Standard speedometers, all sizes, \$6.50; E. Presto tanks, \$10; tool boxes, \$1.25 up; tire trunks, \$4; Brown, Jr., spark plug pump, \$4.10; swivel searchlight, \$6.50; racing seats, \$18 per pair; summer lap robes, \$1.25; steamer rugs, \$2.25; dusters, \$1 up; electric head lights, \$4.50 per pair; side lamps, \$3.00 per pair; tall lamps, 85¢; mechanical hand horns, \$2.45; summer gloves, 75¢ per pair; tire pumps, 75¢; magneto, complete, dual systems, \$17.

We have a special department devoted to parts not carried by any other supply store, such as gasoline tanks for roadsters, \$4.25; carburetors, all sizes and styles; radiators, all kinds, \$15 up; transmissions, \$40 and \$45; steering wheels, \$1.50 up; spark plugs, 20¢ each up; standard make; cushions for all cars, \$2.50 up.

Bearings at ridiculously low prices. Send in your old bearings and we will match it and save you 50 to 75%. Our line of tools contain the best quality.

**SPECIALTIES FOR FORD:** Brown sub-base oiler, Breeze carburetors, \$6.50; seat covers complete, \$7.50; tire covers, 75¢; shock absorbers, \$3.50 set; combination windshield and cowl, \$12.00; one-man tops, \$25; Radiators for Fords, \$16.75; stream line hoods, \$8; demountable wheels and rims complete, \$16.95.

**Tires and Tubes—Guaranteed Quality**

Size	Plain	Non-Skid	Tube	Tube
30x3	\$6.00	\$7.50	\$1.80	\$2.00
30x3½	8.60	9.35	2.15	2.40

Jacks, 50c; channel bumpers, \$4.00; complete speedometer with all fittings, Stewart make, \$6.95.

Thousands of other bargains in supplies, bodies, tops, windshields, motors, axles, complete cars, etc.

Send for the latest edition of our "PRICE WRECKER," containing over 3,000 money saving items for the automobile.

## Times Square Auto Co.

World's Largest Dealers  
S. W. Cor. 56th St. & Broadway,  
New York.  
1210 Michigan Ave., Chicago

## U. S. L. Starters at \$100

We have a few of these starters complete that we can sell at the above price.

**PHILADELPHIA MACHINE WORKS**  
67 Laurel St. Philadelphia, Pa.

We Buy New Bearings  
of all kinds  
**What Have You to Sell?**  
M. G. TIGAR BEARINGS CO., 1876 Broadway,  
New York

For any car or truck. New  
Wheels for Fords, with  
30x3½ Clincher rims. \$1.90  
**Wheels**  
MILLAR WHEEL WORKS  
2211 S. Michigan Ave. Chicago

# The Clearing House—continued.

## SNAPS

D. W. F., Rhineland, New Departure, Hyatt, and other standard makes annular bearings, all sizes, 40% off list. Timken bearings and cups, all sizes, 20% off list. Rayfield 1 1/4" and 1 1/2" carburetors..... \$15.00 Stromberg carburetors, G 1 1/4", double jet 11.00 Schebler Model R, 1 1/4" carburetors..... 12.50 Schebler Model L, 1 1/4" carburetors..... 8.00 Marvel, Holley or Kingston carburetors, 1 1/2"..... 8.00 Prest-O-Lite tanks, model B, filled..... 11.50 Stewart speedometer, Model B, \$50 list..... 12.50 Same with clock and electric light comb. list \$85..... 20.50 Magneto, Bosch 6-cyl. DU 6 H.T...... 50.00 Eisemann H.T., 6-cyl. E.M.I.R. 6..... 42.50 K. W. high tension 6-cyl..... 20.00 Comb. tool box and running board, 60"..... 2.50 Rambler motor, 4-cyl. all models..... 135.00 Other parts and accessories at equally low figures.

**Automobile Appliance Company**  
1436-38 Wabash Avenue, Chicago, Illinois

## WE TEAR 'EM UP AND SELL THE PIECES

We Can Save You Money on Repair Parts or Supplies for Your Auto.

We also buy old autos—condition no object—or any part of an auto, or if you want to trade parts we will trade with you.

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**\$62.50 GARAGE \$62.50**  
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**"BUTLER'S SPECIAL ALLOY PISTONS"**  
Only one-third the weight of cast iron. Eliminate vibration, noise, wear and tear, on bearings, and car. Higher efficiency, easier cranked, quicker pickup, more speed, less carbon. Set of pistons for Fords delivered \$25 guaranteed. The greatest improvement possible for the FORD. Cylinders ground and fitted with Standard or Special Alloy Pistons. Oxy-Acetylene Welding.

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Either cast iron pistons and rings or our special light alloy pistons and rings furnished. State make of car in writing.

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**CYLINDER GRINDING**  
on automatic machinery by skilled mechanics at prices that will interest you. Gears, axles, valves and parts of all kinds made of high grade alloy steel. Send us your worn or broken parts and we will replace them.

Oxy-Acetylene Welding  
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Special Light Alloy  
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Our special facilities  
enable us to do highest  
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## Cylinders Rebored & Reground

and fitted with lighter pistons and McCadden Leakless Rings, regrind pins and rebush rods, makes a smoother running motor than a new one. We set the pace on better rings and lighter pistons.

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Fitted with my heat treated light weight pistons and patented three section rings. From \$6 to \$15 per Cylinder. Ford cylinders reground, fitted with new piston rings, wrist pins and bushings for \$20.00.

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Including new pistons and rings, \$7 to \$11 per cylinder. General overhauling and repairing.

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**CYLINDERS REBORED**  
With new Pistons and Rings fitted, \$8 each. Crankshafts turned. Gears made. Fine machine work.

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**REPAIR EXPERTS**—The satisfaction of having your repairs done by expert mechanics in Connecticut's best equipped garage is important to you. We specialize in automobile painting and repairing. Full line supplies. Send your repairs to **SMITH'S GARAGE**, West Park, Stamford, Connecticut.

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**REBORING OF CYLINDERS**, furnishing new pistons and rings at lowest possible prices. **SCORED CYLINDERS** repaired by our electric process and thoroughly guaranteed.

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Furnish our heat treated piston rings and pistons. First class equipment, 15 years' experience. Write for our prices.

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Size	Used	New	Size	Used	New
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30x8 1/2	6.00	7.80	34x4 1/2	10.00	17.60
32x8 1/2	7.00	8.75	36x4 1/2	11.00	17.90
33x4	9.00	11.85	37x5	12.00	21.00

10% deposit with order, balance C. O. D. subject to examination.

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**In New, Well-Known Fresh Stock Tires**

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30x8 1/2	9.80	37x4	15.00		
32x8 1/2	9.80	32x4 1/2	10.00		
33x8 1/2	10.00	33x4 1/2	14.00		
34x3 1/2	9.50	34x4 1/2	16.50		
30x4	11.00	35x4 1/2	17.00		
31x4	12.50	36x4 1/2	17.50		
33x4	13.50	37x4 1/2	18.00		
34x4	12.00	36x5	19.00		
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Size	If you furnish two casings	If we furnish one casing	Size	If you furnish two casings	If we furnish one casing
28x3...	\$2.00	\$3.00	35x4...	\$8.40	\$6.50
30x3...	2.25	3.50	36x4...	8.50	6.75
30x3 1/2	2.50	3.75	34x4 1/2...	8.60	6.50
31x3 1/2	2.60	4.25	35x4 1/2...	8.70	7.00
32x3 1/2	2.70	4.75	36x4 1/2...	8.80	7.25
34x3 1/2	2.80	5.25	37x4 1/2...	8.90	7.25
31x4...	3.00	5.00	35x5...	4.00	7.50
32x4...	3.10	5.25	36x5...	4.00	7.50
33x4...	3.20	5.75	37x5...	4.00	7.75
34x4...	3.30	6.00	37x5 1/2...	4.00	8.00

Out-of-town orders solicited and given prompt attention. We will advise on receipt of casings what we can do with them, reserving the right of rejection because of condition.

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30x8...	\$2.50	35x4...	\$6.25	36x4...	\$6.75
30x8 1/2	3.50	33x4	6.25	35x4	7.50
30x4	4.25	34x4 1/2	7.00	36x4 1/2	7.25
32x3 1/2	4.50	33x3 1/2	6.75	37x4 1/2	8.25
31x4	4.25	34x4	6.75	36x5	8.25
32x4	6.00	32x4 1/2	8.00	37x5	8.50

Special Low Prices on the Well Known, Brand New, Guaranteed

#### TIRES

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38x5...	\$21.00	34x3 1/2...	\$9.50	32x3...	\$8.75
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These prices are without a doubt the lowest in the country.

We require \$1.00 deposit on all mail orders to defray express charges. All shipments made promptly, subject to inspection.

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#### TIRES

#### All Fresh Selected Seconds

Case	Tube	Case	Tube		
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30x8 1/2	7.90	2.05	35x4 1/2...	17.90	3.60
32x3 1/2	8.65	2.25	36x4 1/2...	18.25	3.70
33x4...	12.00	2.90	37x4...	21.00	4.50

All other sizes in stock. Non-skid 10% extra.

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30x3 1/2	5.00	36x4	8.00
32x3 1/2	6.00	34x4 1/2	9.00
34x3 1/2	7.00	35x4 1/2	9.00
32x4	7.00	36x5	11.00
34x4	7.00	36x5	11.00
36x4	7.00	37x5	11.00

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Size	Plain	Tubes	Size	Plain	Tubes
28x3...	\$5.00	\$1.80	34x4...	\$ 9.00	\$3.20
30x3...	5.00	1.90	35x4...	10.00	3.30
30x3 1/2...	6.50	2.15	36x4...	10.00	3.35
31x3 1/2...	7.25	2.20	34x4 1/2...	12.00	4.00
32x3 1/2...	7.50	2.25	35x4 1/2...	12.50	4.10
34x3 1/2...	8.00	2.35	36x4 1/2...	13.50	4.15
30x4...	8.50	2.85	37x4 1/2...	14.00	4.25
31x4...	8.75	2.95	36x5...	15.00	4.95
32x4...	8.50	3.05	37x5...	16.00	5.05

Non-Skids \$1.00 Extra; All Sizes

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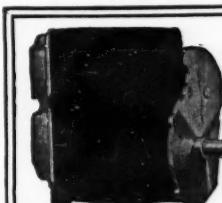
N. A. PETRY CO., Inc., 1309 Race St., Philadelphia, Agents for Penna. and Atlantic Coast States, South.



### SPROCKETS CHAINS AND DIFFERENTIAL

IN STOCK OR ORDER  
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Chicago



### FOR FORD CARS FISHER ELECTRIC LIGHTING and STARTING SYSTEM

Motor and generator combined in one compact, self-contained unit, although acting independent of one another. 12-volt, 8-wire system, 6-volt lamps. Noiseless. Attached without machine work. Write.

Fisher Electrical Works, Detroit, Mich.



### The Simplex (Short-turn) Automobile Trailer

Quickly attached to any automobile. Light, durable. Trails in the tracks of the automobile. Will not skid. A modern necessity at a nominal price. Write for liberal dealer proposition.

THE SIMPLEX SHORT-TURN GEAR CO.  
Dept. G, Anderson, Ind.

### HORN and FAN Combined



\$5

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#### Gets the Roads

No gears, motor, batteries or wires to give trouble. Gives warning signal by merely pushing the button at driver's seat. Increases efficiency of fan and motor. Keeps radiator cool. Never fails to sound. Long life. Is easily interchangeable with fan on any Ford in a minute's time. Most reliable and safest horn. Write for dealer's proposition.

Fan-Horn-Pump..... \$12.50  
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### MIDGLEY PATENTED Wire Tread TIRES

#### Plain and Non-Skid —Inner Tubes

Unexcelled—Write for  
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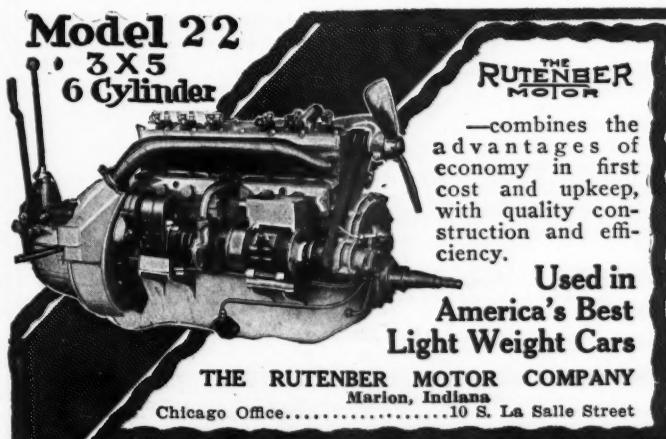
### The Midgley Tire & Rubber Co.

Dept. 11, Lancaster, Ohio

701

### Model 22

3x5  
6 Cylinder



THE RUTENBER  
MOTOR

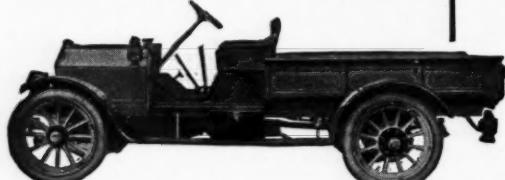
—combines the advantages of economy in first cost and upkeep, with quality construction and efficiency.

Used in  
America's Best  
Light Weight Cars

THE RUTENBER MOTOR COMPANY  
Marion, Indiana  
Chicago Office..... 10 S. La Salle Street

**"The MENOMINEE" TRUCKS**  
FOR ECONOMY

**\$1125—\$1400—\$1800**



Model A-3, 1500-lb. Truck, Complete with Express or Stake Body, \$1200. Chassis only, \$1125

**Your Choice in Size and Price  
The Quality's the Same**

You can choose the MENOMINEE price you want from \$1,125 to \$1,800.

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But whatever the size or price—MENOMINEE quality is the same.

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**Dealers**—Everybody is satisfied with his Menominee. Write for catalog and dealers' liberal proposition today.



**D. E. POYER CO.**

Menominee

Michigan



**THE SIMMS HIGH-TENSION MAGNETO**

AND

**SIMMS-HUFF MOTOR GENERATOR**

Increase the power of your car by equipping it with a Simms High-Tension Magneto—the most highly developed and efficient ignition system for gasoline motors.

The Simms-Huff Motor Generator is the lightest, simplest, and most successful starting and lighting system manufactured.

Automobile engineers unite in pronouncing Simms products as "Electrical Equipment Par Excellence."

**The Simms Magneto Co.**

East Orange, N. J.

*Dealers and Owners of Ford Cars, Write for full information about the Simms-Huff Starting and Lighting System for Ford Cars*



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**INLAND**  
1 PIECE  
PISTON RING



A Perfect  
One-Piece  
Piston Ring

that has all the virtues of eccentric, concentric and more-than-one-piece construction; and none of their disadvantages.

A continuous ring cut spirally for half its circumference, heat-treated so that the free ends hug tightly together; the result is an absolutely gas-tight ring that uncoils in expanding; insuring uniform pressure and perfect contact with the cylinder walls.

The strongest gas-tight ring on the market, because of its simple one-piece construction and, for the same reason, it costs less to buy; and less to install, for it is easier to put on and will not break in handling.

Absolutely guaranteed; money refunded  
on any ring that fails to give per-  
fect satisfaction after 90 days' trial

*Full description in free booklet  
Dealers and jobbers should write for interesting prices*

**Inland Machine Works**

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**The Top that gives double protection.**

Cover your car with Rayntite. Protect yourself, your car and your friends from drizzles or cloud-bursts. Safeguard your pocketbook from constant repair drains. Make sure of a handsome, durable, washable top unaffected by changes in temperature.

**RAYNTITE**

Guaranteed one year not to leak

is sincerely guaranteed—backed by the century-old DuPont reputation for integrity of purpose, superiority of product and financial responsibility. It gives real service because real service is built into it. Made in both single and double texture. Any top maker can supply you. Insist upon Rayntite for new tops or tops that need re-covering.

*Write for free samples and booklet*

**Du Pont Fabrikoid Co. Wilmington, Del.**

Canadian Factory and Sales Office, Toronto



Brushing aside the restraining influences of convention the designers of the aristocratic

### Owen Magnetic

planned and standardized the equipment of this marvel car with the dual idea of making every essential and feature conform mechanically to the excellence of its chassis and aesthetically to its superb lines.

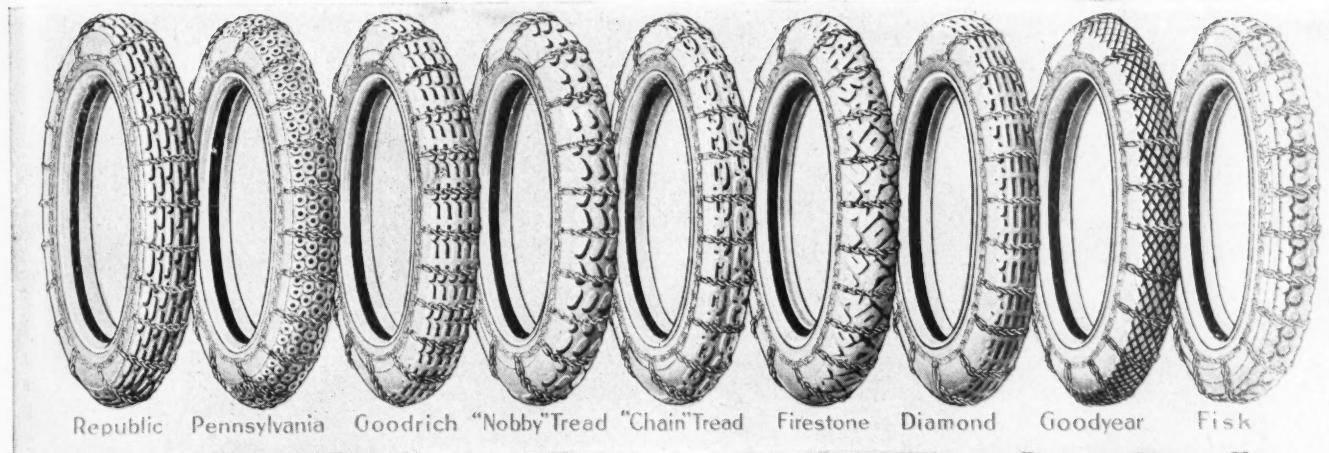
## HOUK "QUICK CHANGE" WIRE WHEELS

are standard equipment—were so planned from the first—and as such are furnished on every Owen Magnetic Car.

This is one of the strongest endorsements Houk Wire Wheels could have—that they should be standardized on a car which was designed to establish a new standard of riding and driving conditions.

**HOUK MANUFACTURING COMPANY**  
BUFFALO, NEW YORK

Chicago, 2337 Michigan Ave. New York, 1792 Broadway San Francisco, News Building



Republic Pennsylvania Goodrich "Nobby" Tread "Chain" Tread Firestone Diamond Goodyear Fisk



Lee Keaton Kelly-Springfield



Empire Racine Prowodnik

## "What's the Proper Size of Weed Chains to Use on These Tires?"

The above is the everyday question being asked thousands of dealers relative to the correct sizes of Weed Chains to use on the numerous styles of "fancy-tread" tires shown on this page and all others that could not be illustrated owing to lack of space.

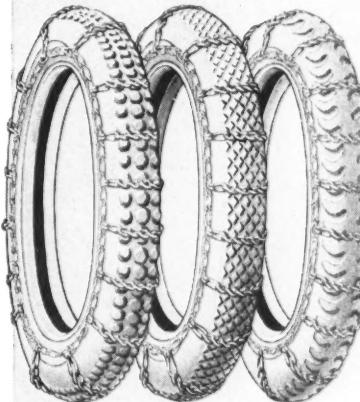
We therefore call your attention to the fact that all styles of "fancy-tread" tires require the same size Anti-Skid Chains as do plain-tread tires. For example, if you equip your car with  $36 \times 4\frac{1}{2}$  "fancy-tread" tires, you will require  $36 \times 4\frac{1}{2}$  Weed Chains, the same as you do for  $36 \times 4\frac{1}{2}$  plain-tread tires.

*The proper sizes of Weed Chains to fit all sizes and styles of tires are carried in stock by dealers everywhere.*

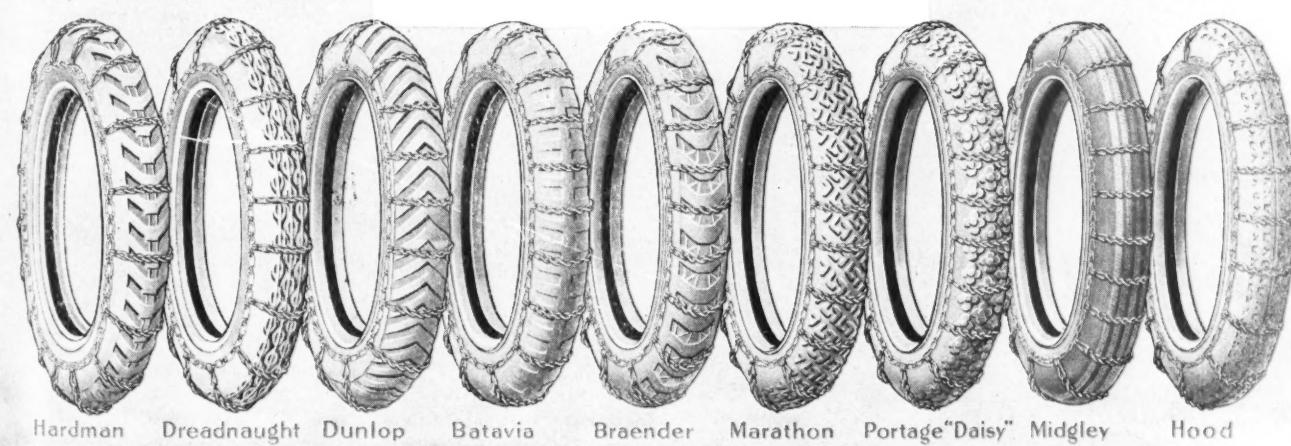
**Weed Chain Tire Grip Company**  
Bridgeport, Conn.



Nassau Gaulois Knight



Federal Ajax Miller



Hardman Dreadnaught Dunlop Batavia Braender Marathon Portage "Daisy" Midgley Hood

# Overland

TRADE MARK REG.

## Delivery Cars

### \$725 A Highly Profitable \$750 Trade Developer

*J. o. b. Toledo  
Open Express  
Delivery Car*

*J. o. b. Toledo  
Panel Body  
Delivery Car*

COMPETITORS are daily convincing your customers of the promptness of motor delivery.

For today, more than ever before, continued patronage depends largely upon the maintenance of satisfactory delivery service.

Why not hold your own customers and obtain others from less progressive merchants? That is just what the Overland Delivery Car will help you do.

The price of this car is astonishingly low. Also, the cost of operation is proportionately small.

It is *cheaper than a horse and wagon to operate*—yet it does three times as much work.

The famous 35 horsepower Overland motor has power in excess of anything you will ever require. It is smooth running and always dependable.

The Overland Delivery Car is electrically lighted and started. Ignition is by high-tension magneto. The car has a revolving oil indicator, large tires and other advantages found on no other delivery car at this low price.

This substantial, highly efficient vehicle not only saves money for its owners—it *makes money* for them.

*Write today for a special delivery car catalog.  
Please address Dept. 496.*

**"Made  
in  
U. S. A."**

**The Willys-Overland Company, Toledo, Ohio**

Also Manufacturers of the Overland and Willys-Knight pleasure cars

